

BUTANE-PROPANE

HEADQUARTERS FOR LP-GAS
INFORMATION SINCE 1931

News

LIQUEFIED PETROLEUM GASES

WARREN'S

NORSWORTHY, HOUSTON, TEXAS LP-GAS TERMINAL

BUREAU OF MINES
RECEIVED

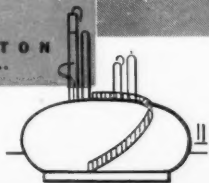
DEC 20 1948

DEPARTMENT OF THE INTERIOR



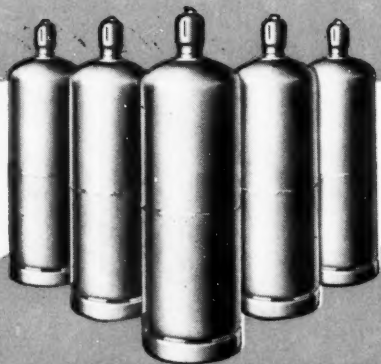
WARREN PETROLEUM CORPORATION
TULSA, OKLAHOMA

DETROIT MOBILE HOUSTON
NEWARK, N. J. MT. VERNON, ILL.



DECEMBER, 1948—50c per Copy

TIME should govern
your thinking . . .



on CYLINDERS

That's right! Your investment in cylinders should be considered from the standpoint of years. In buying Hackney L-P Gas Cylinders you are buying advantages that save you money year after year.

Although extremely rigid and strong in construction, Hackney Cylinders are lightweight. This means repeated economies throughout the long lives of these sturdy Hackney Cylinders. You repeatedly save money on maintenance,

too. The finishing procedure means less repainting; the "scalloped" ring permits thorough inspection facilitates cleaning. Labor costs are reduced year in and year out.

So when you consider cylinders member you are making a long-term investment. Make certain you are getting the advantages that grow more important with each year. For full details on Hackney L-P Gas Cylinders, write us.



Pressed Steel Tank Company

Manufacturers of Hackney Products

Main Office and Plant: 1487 South 66th Street, Milwaukee 14, Wis.

1399 Vanderbilt Concourse Bldg., New York 17

208 South La Salle Street, Room 2069, Chicago 4

227 Hanna Building, Cleveland 15

552 Roosevelt Bldg., Los Angeles 14

CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

NOTHING ELSE LIKE IT

IT'S SMALL

This meter is encased in a compact, lightweight pressure cast aluminum alloy housing. It has an accurate, durable double diaphragm measuring unit having a capacity of 90 cfh of 1 sp. gr. gas at $\frac{1}{2}$ in. pressure absorption; ample for practically every service.

IT'S SAFE

There is only one gasketed joint to seal against leakage to atmosphere. There are no soldered joints to make or break. Meter is leak-tested at 10 psi. The pressure cast aluminum alloy case has a high resistance to fracture.

IT'S SIMPLE

The construction follows the time-proven Emco pattern with all working parts attached to a removable valve plate. After a period of years the complete mechanism can be economically replaced by inserting a new valve plate assembly in the housing.

SELL MORE LP-GAS SERVICE

ROCKWELL-EMCO NO.00 LP-GAS METERS

Larger sizes available in Emco No. 0, 1 and 2 models

METERED domestic outlets are a strong selling argument for LP-gas service. Your customers and potential customers want them . . . for meters inspire confidence. They make possible service comparable to a utility operation. They effect many distribution economies. And in today's competitive fuel market you just can't afford to operate without them.

WRITE FOR BULLETIN 1163



PITTSBURGH EQUITABLE METER DIVISION
Rockwell Manufacturing Company
PITTSBURGH 8, PA.

Boston Chicago Houston Kansas City Los Angeles

SIMPLE TO REPAIR . . .
Showing how entire working mechanism lifts from meter case for economical replacement.



Don't let meter repairs scare you! In this design only a screw driver is needed to completely renew the interior parts with a factory assembled and tested unit. Anyone can make the switch in a few minutes time.



LETTERS	39
COMMENT	43
BEYOND THE MAINS	Ed Titus 47
"THE PEOPLE ARE GAS HUNGRY"	Verlin E. Condee 51
AVAILABLE GAS SUPPLY SIX TIMES PRESENT DEMAND T. W. Legatski	58
STREAMLINING A BULK PLANT	Ed Titus 63
INCREASING THE SAFETY FACTOR IN TRUCK TANK DESIGN Si Hedlund	66
THE BEST PLACE TO SELL: AHEAD OF THE ELECTRIC LINES	76
CONVERT 6000 METERS FROM WATER GAS TO PROPANE-AIR.....	78
BURNER ADJUSTMENT, PART 2	C. C. Dudley 82
NOW IT'S THE NIGHT SCHOOL!	94
CHECKING EQUIPMENT TO MAKE A SAFER INDUSTRY ...D. L. Breting	99
"AS LONG AS THERE'S BEEN AN INDUSTRY" THE 25-YEAR CLUB	106
ASSOCIATIONS	108
LIQUID METERS	J. W. Johnston 113
POWER: POSITIVE LOCK-OFF REGULATORS	Stanley Bell 132
PRODUCTS	142
CALENDAR	158
FUEL REQUIREMENTS FOR SPACE HEATING.....	161
THE TRADE	162
CLASSIFIED	182
1948 ANNUAL EDITORIAL INDEX	184
ADVERTISERS	192

Publication Office

Los Angeles (4)—198 So. Alvarado St. Phone DRexel 4337.

Branch Offices

New York (18)—11 W. 42nd St. Joseph M. Dematthew, Manager. Phone: CHickering 4-1969.

Chicago (3)—1064 Peoples Gas Bldg. David Carmen, Manager. Phone: WABash 2-2589.

Dallas (8)—2411 Nicholson Drive. Robert B. Farson, Manager. Phone: YAlle 2-9455.

San Francisco (5)—1085 Monadnock Bldg. Les Meek, Manager. Phone DOuglas 2-4475.

Lynn C. Denny, Editor; Edward K. Titus, Eastern Editor; Paul Lady, West Coast Editor; Harold W. Wickstrom, Technical Editor; O. D. Hall, Mid-Continent Editor; Fred L. Dalton, Art Editor.

Jay Jenkins, President and Publisher; James E. Jenkins, Secretary-Treasurer; Robert C. Horton, Circulation Manager.

December 1948

Volume 10

Number 12

BUTANE-PROPANE News is published monthly. Copyright 1948 by Jenkins Publications, Inc., at 198 So. Alvarado St., Los Angeles 4, California. Subscription price: United States and U. S. Possessions, Canada, Mexico, Cuba, South and Central American Countries (in advance), 50¢ per copy, one year \$2.00; two years, \$3.50; three years, \$5.00. All other countries \$3.00 per year. By air mail \$8 per year, in U. S. only. Entered as second-class matter May 29, 1939, at the post office at Los Angeles, California, under the Act of March 8, 1879. Member of Audit Bureau of Circulation; Associated Business Papers, Inc.

Publishers: GAS, The Magazine of the Gas Utility Industry; HANDBOOK BUTANE-PROPANE GASES; THE BOTTLED GAS MANUAL; Annual BUTANE-PROPANE News CATALOG; B-P News BULK PLANT DIRECTORY; WESTERN METALS.

LETTERS

● **BUTANE-PROPANE** News welcomes letters from our readers, but it must be understood that this magazine does not necessarily concur in opinions expressed by them.—Editor.

Gentlemen:

There is an alfalfa dehydrating plant near us desirous of changing from oil to butane if there would be any economy in it. Will much appreciate any information you can give us, such as the cost per ton, etc.

M. B. C.

Nebraska

There are many dehydrating plants operating on butane. If the price per gallon of butane is near the price per gallon of oil, the ease of handling, controlling, and cleanliness usually will influence the user to switch to gas.

Better efficiency per pound of fuel can be obtained with the LP-Gas burners than with the oil for this type of service.—Ed.

Gentlemen:

We would appreciate your opinion of size of burner for heating a 100 gallon syrup boiler for butchering hogs. Water must be at 180 degrees.

Which would you recommend, a cylinder or regulated pressure?

J.E.P.

South Carolina

It should operate at low pressure. Several cylinders may be needed in a battery to furnish sufficient gas to operate continuously.—Ed.

Gentlemen:

In talking to one of the large manufacturers and suppliers of propane in this area, we queried them about the use of "Methanol" for use as an additive in cylinders of propane gas. We

were referred to you, and in this connection we would like to express our interest as one of trying to determine the recommended use; that is, quantities and the methods of application.

We were further advised that there are alcohol injectors on the market for this purpose, and we would like as much information on this as possible.

We would greatly appreciate anything that you can give us on these subjects.

J. T. H.

Minnesota

Alcohol is used spasmodically in the LP-Gas industry to help troubles due to hydrate formation in cylinder regulators.

The fundamental cure for this trouble is dehydrated product and tanks and cylinders that have been thoroughly dried before use.

There are locations and operating conditions that cause troubles and these can be alleviated by the use of alcohol in the tanks and regulators.

The quantities usually used are a pint to a quart per tank. Most of the injectors are homemade.—Ed.

Gentlemen:

We have installed a 500 gallon tank at a university in a nearby town for cooking and hot water. Now they would like to use the gas in their home economics department and laboratory. The building which houses the two departments is about 500 feet from the propane gas storage tank, and we are unable to get enough of the proper size pipe to run the line on low pressure.

Could we use a 20 lb regulator at the tank and a low pressure regulator at the building, and run $\frac{3}{4}$ " copper tubing the 500' necessary to get

to the building, and run $\frac{1}{2}$ " pipe from the regulator to the appliances?

If you could tell us, we would like to know how many cubic feet of gas would pass through this system per hour.

F. W. H.

Tennessee

Good appliance performance depends upon steady pressure and we doubt if you can obtain a regulator that would function well on the restricted upstream line size.

We suggest that you run a one inch copper line (this pipe is available) which will give you about 60 cubic feet per hour at low pressure.

If additional equipment is added to the laboratory or kitchen, a regulator can be installed at the tank to operate at 5 or 10 pounds and you will have an ample supply to the house regulator.

The $\frac{3}{8}$ in. pipe will carry about 15 cubic feet per hour with a five pound drop.—Ed.

Gentlemen:

Do you know of certain attachments or separate units to present bottled gas cylinders located at homes of individual users for which the claim is made that such attachments or separate units will blend butane or propane with air and thus reduce the consumption cost?

One particular concern in our locality claims to have perfected an apparatus that will actually gasify petroleum gasoline for home use.

I have learned from your Bottled Gas Manual that large central systems that furnish gas to communities via pipeline do blend the liquefied gas with air, but I am wondering if such a means has yet been found practical whereby the individual home owner can blend with air?

If you know of any concerns manufacturing the above or can give any information please let me hear from you.

H. B. L.

Ohio

There is no advantage in blending air with propane at the cylinders as this operation is

done automatically at the appliance burner and the efficiency of an approved burner for use with propane is as good as burners for other types of gas.

There have been devices manufactured and sold for making a combustible gas from gasoline for many years but they have never given the quality of performance available from bottled gas.—Ed.

Gentlemen:

We are just starting in the LP-Gas business using propane bottled gas from Western Propane Ltd., of Calgary. We do not seem, however, to get anything like the length of service claimed by customers in your magazine. For instance, in the October issue of the *News*, page 47, Mr. Harry L. Spooner claims a range used by a family of four buys only 18 20-pound cylinders a year. This would be only 360 lbs a year or less than four 100-lb cylinders which would be a little better than three months to a 100-lb cylinder.

We have a customer (family of two) who has an LP-Gas range and a hot water tank, set at only 140 degrees. The customer can only get three weeks from a 100-lb cylinder. There are definitely no leaks. These people do not use an over supply of hot water—no automatic washer or other such appliances and do not do as much baking as an average family would.

We have another customer who has only a range and no hot water heater. They have now gone four weeks on a 100-lb cylinder but the tank is getting low and will certainly not go six weeks.

We are at a loss to understand why other people can claim to get so long a service from one cylinder of gas. Would the size of tubing have an effect on the length of service ($\frac{3}{8}$ -inch tubing used from the regulator to the appliance, a distance of 25 feet)? Would the fact that the tanks were filled at one altitude and used

at an entirely different altitude have any effect on their usable life?

We are very much sold on the uses of LP-Gas and had contemplated investing in a bulk storage system but at this cost (we understand \$20,000 to \$30,000) we would have to see far better results before we would feel justified in spending this kind of money. Our gas from a bulk plant would have to retail at 12 to 14 cents per pound—pretty expensive for three weeks' supply don't you think?

Another problem that comes to mind is cold weather operation. None of your books seems to enlighten us on the proper or best way we could overcome this difficulty. We of course are a very extreme case as our weather often goes forty degrees below zero.

R. S. F.

British Columbia

Consumption of fuel regardless if it is propane, natural gas or oil, varies with each individual user. Neighbors living in the same size house with the same size family will vary as much as 100 per cent in their fuel consumption.

Causes of this are mainly the attitude of the family regarding the relative value of comfort and service versus cost or their ability to pay for the additional comforts and conveniences obtainable by the use of fuel.

Some of the things that cause high fuel bills are:

1. Limed-up water heaters that have a very reduced efficiency.
2. Water heaters piped up so a free circulation of water is not possible.
3. Leaks in hot water faucets.
4. Use of ovens and top burners on stoves to take the chill off the house in the morning or other times of the day.
5. Use of natural gas appliances that have not been satisfactorily changed over for use with LP-Gas.

The change of altitude has no effect on the

gas in the cylinders but may have an effect on the efficiency of the appliance burners. This can be checked by direct inquiry to the manufacturers.

Your price is high and if there are other fuels selling at much lower competitive prices, you will experience complaints on high bills and will have difficulty expanding. If your competition is in the same range you should do well as liquefied petroleum gas is the ideal fuel for domestic use.

Extreme cold weather operation requires roping and, if possible a product that has been dehydrated. If not, the use of a moisture remover will help. To take care of the extreme cold weather operation, you will require larger storage than usual. We refer you to "The Bottled Gas Manual," Chapter 4, for the information on this subject.—Ed.

Gentlemen:

The liquefied petroleum gas industry is confronted with tremendous losses each year in the handling of LP-Gas. Our operation involves unloading tank cars into bulk plants and redistribution from the bulk plant to the customer's underground tank. It would appear that this would correspond with a gasoline operation where a distributor would unload gasoline into his bulk plant and deliver to his filling stations.

We are wondering if you could advise us as to what losses are considered normal for this type of operation in the gasoline industry expressed as a percentage of gallons purchased or gallons sold.

E. R. W.

Florida

Handling losses of one-half per cent to one per cent are normal in gasoline distribution and are caused by evaporation, temperature changes and measuring losses.

When losses get to be much greater than one per cent, usually a careful check is made on all operations, including checks for leaks, calibration of meters, tanks, etc.—Ed.



SAFETY

PLUS SUSTAINED ACCURACY



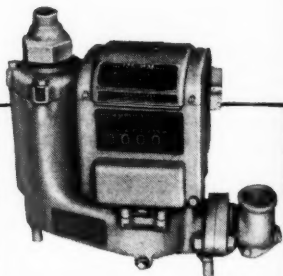
LP-GAS METERS give you both!

Red Seal LP-Gas Meters are high-pressure meters specifically designed for a maximum working pressure of 250 lbs. per square inch. This working pressure is more than adequate to satisfy all the safety requirements for LP-Gas metering service. As another safeguard, every LP-Gas Meter installation includes an efficient pressure relief valve.

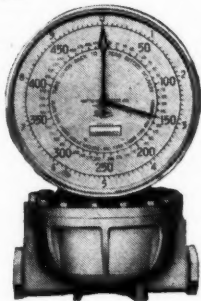
As profit-protection, most important is the *sustained accuracy* that has made Red Seal the preferred meter among LP-Gas marketers. This reputation for sustained accuracy is due to the precision engineering and manufacture of the measuring chamber and the piston, its only moving part. Because this simple functional unit is skillfully machined to close tolerances, no liquid LP-Gas can pass through the chamber without actuating the piston. Sustained accuracy is assured; profit is safeguarded.

Get all the facts about Neptune Red Seal LP-Gas Meters—the No. 1 choice of marketers. Learn all about the money-saving advantages of the exclusive Unit Replacement Plan. Phone or write today.

NEPTUNE METER COMPANY, 50 West 50th Street, New York 20, N. Y. Branch Offices: Atlanta • Boston • Chicago • Dallas • Denver • Kansas City, Mo. • Los Angeles • Louisville • Philadelphia • Portland, Ore. • San Francisco • NEPTUNE METERS, Ltd., Long Branch, Ontario, Canada.



1 1/4" Compact LP-Gas Meter with new, improved Print-O-Meter Register that provides delivery tickets for customers, accounting records for you.



2" Type D LP-Gas Meter with Register Model 211. Both sizes are used on tank trucks, loading racks and dispensing units.

NEPTUNE

LP-GAS
**RED
SEAL**

METERS

COMMENT

RECENT information gives an indication where the 1949 Rural Electrification Authority loans may extend rural electricity transmission lines. The REA figures show the number of electrified and unelectrified farms in each state, the percentage of unelectrified farms and the allotments made for each state.

A quick look will enable dealers to figure out where strong competition is going to be found in a very short time. A large allotment in a given state will, as a matter of fact, cut into the business of all dealers in that state unless they instigate aggressive selling ahead of such expansion.

LP-Gas distributors with expansive ideas might well study the column which shows the number of unelectrified farms in individual states.

It's hard to beat the railroads.

The Interstate Commerce Commission has agreed that LP-Gas, weighing approximately two pounds less per gallon than gasoline but for years shipped at the gasoline freight rate by the railroads, should be based upon its approximate actual weight of 4.7 lb per gal. Then the ICC turns around and allows railroads to establish rates on LP-Gas equal to 45% of first class rates.

So in the end, dealers probably will be paying the equivalent in freight of what they paid before.

The Pacific Coast oil strike is over but the injury to the LP-Gas industry in western states did not end with the signing of peace terms between workers and producers.

The loss of production for the more than two months that the men were out on strike cannot be made up during the coming winter, for the Pacific Coast demand was more than 20% greater than local production before the strike. And, hence, there is a dual shortage to face—insufficient production and lost gallonage that occurred while the refineries were running short of schedule.

The partial remedy will lie in dealers filling their own and consumers' storage whenever fuel is available and sharing each other's stocks in any emergencies which may arise.

Some people like to roast the producers, as they do all big business, but this fall when extreme shortages occurred on the Pacific Coast due to the labor strike in oil refineries, tank car shipments were made from the Midwest at an extra cost of from 5 to 12 cents per gallon.

Who paid this extra freight charge?

The producers. They did not ask a single dealer to stand any additional freight although they easily could have done so.

By Ed.



FREE FREIGHT!

EAST OF THE MISSISSIPPI

We will make carload deliveries of PRO-BALLS f.o.b. our plant with freight allowed to any point east of the Mississippi River. \$1.30 per cwt. freight will be allowed on all carload shipments made west of the Mississippi River. This is your chance to increase profits.

12 MONTHS TO PAY!

PAY AS YOU SELL

Pay as you sell, or in twelve monthly installments. Imagine—a carload in stock—freight allowed and twelve easy payments!

Send your order today or wire to have one of our representatives call to explain the details.

Carload is approximately
70 PRO-BALLS.

PRO-BALL SPECIFICATIONS

Water capacity..... 115 gallons
Weight..... 320 pounds
Diameter (I.D.)..... 37 inches
Working pressure.... 200 P.S.I.
Construction..... A.S.M.E. U-69

FULLY TESTED



PRO-BALL is fully tested and is listed by Underwriters Laboratories. Re-examination Service and carries the U. L. Label.

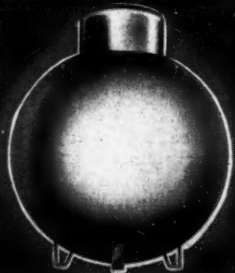
EQUIPMENT includes magnetic gauge and the finest, most modern valves and fittings available in the industry.

UNITED'S PRO-BALL

115-Gallon Propane System

Modern... Streamlined... Completely Equipped...

Light in weight!
(Approx.
300 lbs.)



Your best buy this year
BY THE CARLOAD!
Phone or wire your
orders collect.

UNITED PETROLEUM GAS COMPANY



806 ANDRUS BUILDING
MINNEAPOLIS 2, MINNESOTA

BEYOND THE MAINS

THE battle for steel continues. From Washington it's indicated things are looking up a little at this writing for the butane-propane industry. At first it appeared the fervent pleas of more heavily financed industries might smother the petitions of our own industry which, although large, is comparatively new, and has not had time to cement itself together to the point where it can put up as strong a Washington front as some.

As the deadline approached for this issue, the essential needs of the butane-propane industry were due to be formally presented again soon to the Steel Products Advisory Committee.

We were informed the situation looked good, in theory at least, as soon as requirements of certain national security projects were handled. A day in the middle of November was devoted to atomic energy needs, then came some essential mining requirements, barges, also tanks for petroleum. On Nov. 18, recommendations were to be discussed with a cabinet group of under-secretaries. It was therefore planned that when recommendations were put before the Steel Products Advisory Committee on Nov. 19, they would carry the full force of a government recommendation. With election over, actions in Washington can be of a more definitive nature.

The industry will need to be persistent and forceful.

•

France is increasingly interested in liquefied petroleum gas. A representative of that nation's utility industry has been looking around this country to secure know-how for establishing standby butane or propane facilities for use during peaks.

•

Some of those in the LP-Gas business in England would like it if there were more competition there among producers.

•

From several sources it's learned the fetish held by some against selling propane house heating in the Northeast is not subscribed to by all those in the business in New England. One operator believes that all kinds of space heating can be sold there, including large dwellings. Another, not so long in the business, is making an aggressive attempt to land heating business. And there's at least one development of new small homes, where liquefied petroleum gas serves for space heating.

•

Add ingenious uses for propane: Chain stores have employed bottled gas to salvage live lobsters. When the point approaches

when they can't be sold alive, they're tossed into the kettle and boiled. Then they'll keep. Otherwise they'd have to be sold at a terrific sacrifice before it was too late.

A short natural gas supply in the Canadian province of New Brunswick has led to establishment of a sizable bottled gas operation in Moncton. It will attempt to spread out to the other Maritime Provinces of Nova Scotia and Prince Edward Island.

"Foggy" is a good word for some of the government's policies about pricing. This is how they were described by John Hancock, of New York, testifying before Senator Capehart's committee considering effects of outlawing basing point pricing.

And what about the election? No attempt will be made here to appraise the results or take sides. No matter which way it's gone, though, it's a good thing when all the fuss and turmoil are over, and business can settle down to make its calculations for the next four years.

The result seems to demonstrate that when most leaders of labor and farmers are in agreement, they can pretty much control the country until further notice. Prosperity and power for farmers don't hurt the butane-propane industry. Quite the contrary.

As far as labor is concerned, it's elementary that the Taft-Hartley Act will be modified, although all its principles won't be done away with, in whatever new legislation is passed, since the country is well fed up with certain abuses of power. However, the power of labor leaders will rise after having waned for a while. This adds significance to programs like the recent one of the New Jersey Liquefied Petroleum Gas Assn., where employe relations problems were to the fore.

Regarding economic conditions generally, it's suggested the industry shouldn't pay too much attention to the stock market and what happens in Wall Street. Those fellows mill around among themselves and don't get out enough to see what's doing in the rest of the country. There's a lot of pent-up demand for products of basic industries like housing and automobiles.

And don't forget what we heard in Atlantic City this fall about the public having a good deal of money in its hands, plus eager desire for what the butane-propane industry has to sell.

This sort of thing is a lot more basic than what happens in Wall Street, and what happens at elections.

Ed Titus



"The People Are Gas-Hungry!"

ONE REASON the LP-Gas industry has forged ahead so rapidly is that it is composed of dealers who have the courage to strike out on uncharted courses.

With fewer precedents than in older lines of business, these pioneers have been forced to drive ahead as their judgment and circumstances dictated.

Here is a success story of an LP-Gas dealer in Illinois who has developed a prosperous business out of hard work, who has built the equivalent of a town plant out of groups of small, integrated installations, and who has done this without help from others, without capital other than his own company has made.

It just shows what energy and a good spirit and a worth while goal can do in the LP-Gas field today.—Editor.

By VERLIN E. CONDEE

CONDEE Radio Electric, which handles the sales and servicing of refrigeration and air conditioning equipment, bottled gas, and bulk propane, as well as electrical contracting, is growing. We are situated in Mt. Sterling, Ill., a town of 2,400, and are now busily engaged in expanding our metered gas distribution system.

We started this system with one 1000-gal., Skelgas, heavy duty system for our store and a restaurant two doors away. The drug store next door then applied for service, and was followed by a beauty shop and another nearby restaurant. (Because of a garage construction close by, our distance allowance



was cut and we are now replacing this installation with three 500-gal. tanks.)

We began to suffer badly from a shortage of cylinders. We served several more restaurants from cylinders as well as some other accounts in the business district so we decided to cover the business district with pipe lines so we could free these cylinders in order to sell more stoves.

The pipe lines were put in during the fall of 1947, and we are now serving 16 stores, 2 beauty shops, 4 apartments, 4 restaurants, 1 tavern lunch and 1 doctor's office as well as furnishing ignition gas for the large oil-burning boilers which operate the Prairie Farms creamery plant, all in the business district.

The main lines are $\frac{3}{4}$ in. ID copper type K. (Our house services are $\frac{3}{8}$ in. type K with some mains dropping to $\frac{5}{8}$ in. and $\frac{1}{2}$ in. copper.) We run a great deal of our

One 500-gal tank with bases for two. This was the first installation. Part of office and service personnel shown is (left to right): Helen Holtschlag, Barbara Rosson, Verlin E. Condee, Louis Hendricks, Wilford Langdon.

lines on the buildings in the business district. The buildings are of very soft brick, and we find that for this heavy load it is much better to make a meter make-up on a steel plate; it then takes only four lead anchors to hold it to the building.

Each business meter-regulator costs about \$40 mounted, with not more than 15 ft. of service line. We use Emco meters, both the top and the side types. We are starting to use a 922 Fisher regulator with Sprague meter for small residence loads. We find that it is much cheaper as two screws will hold the meter and the regulator can be fastened to the meter with a short, $\frac{1}{2}$ in. nipple. Our heavier installations are all 722 Fishers, some with

POL high pressure side and some with $\frac{1}{2}$ in. internal pipe thread entrances.

All lines are brazed with "Sil-Fos," and we use no flare nuts underground except where taps are made. For taps we drill a $\frac{1}{2}$ or $\frac{3}{8}$ in. hole in the main line and braze a pipe into it, strapping the valve to the main for support. Valve boxes are made of both wood and concrete and then covered with 6 to 8 in. of dirt.

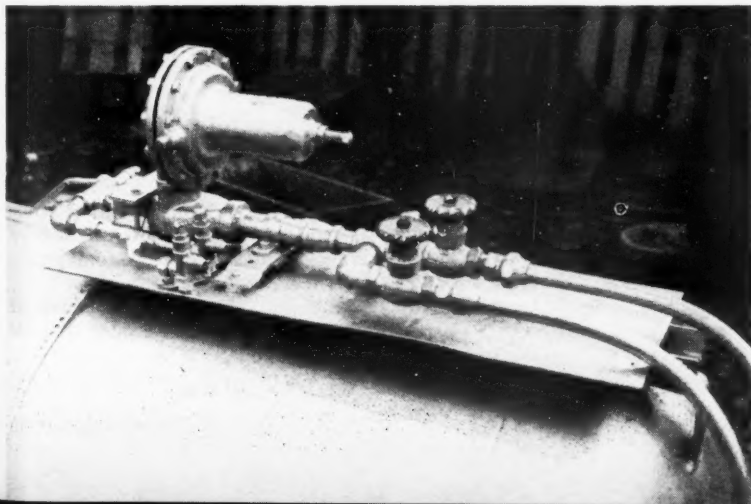
When present construction is finished, which will be before freezing weather sets in (we hope) we will have in service six 1000-gal. tanks and five 500-gal. tanks. One location will have two of the larger tanks spaced three ft. apart, as the load is too heavy to hold

the pressure in very cold weather. We use 20-lb line pressure and have no trouble of any kind.

By the middle of December we will have 100 meters in service. We charge 16 cents per therm for heating. We have two commercial cooking rates and one straight household cooking rate as well as a "dual" rate for stove and one automatic appliance, a refrigerator or a water heater. We have step rates, with a rate to cover household needs and a dropped rate for those who heat. Small spot heaters are run on the regular rate; we don't grant the heating rate unless it is a complete heating job. Meters are read the first of the month and billed at once, with 5% penalty five days from mailing date.

Many builders of new homes are installing floor furnaces, together

Regulator and valve setup. There will be two more tanks added here immediately. One can be removed from service for repairs without disturbing the others. All will have hoods.



with water heaters. This means in all cases that the individual buyer will install a gas stove when he moves in.

We bury our lines a minimum of 24 in., and then drop to 30 to 36 in. where our lines cross an alley or street. When we pass telephone or light poles we protect our copper against the dangers attendant to pole replacement with a piece of 1¼ in. conduit. We are now dickering for a franchise and will pay the city 5 cents per meter per month in exchange for the use of public thoroughfares.

Bulk Tank Capacity Doubled

We find that with the 20-lb. main we can carry about twice the rated capacity of a bulk tank. Of course, service by the bulk truck is often made necessary at this time. We eventually expect to tie our lines together and supply from large storage... in fact, from a central storage. We will be hauling our own Skelgas from the Springfield plant of the Skelly Oil Co. as soon as the load is enough to warrant buying our own truck. We have a number of customer-owned tanks around the territory and several hundred cylinder customers. Many of these would not have been sold if our metered gas service had not released some of the cylinders in use.

Applications for service are coming in so fast that we cannot start to fill this year's demand for additional group installations. We try to put in only the blocks that present the largest load. We can install two-block job complete with regu-

lators and meters with 80% of the residents going on a 1000-gal tank for \$1,200. We own this equipment and charge for the line from the alley or street to the customer's location. We have a shutoff valve ahead of the meter.

We find that after the line is installed the additions come fast. The people are "gas hungry."

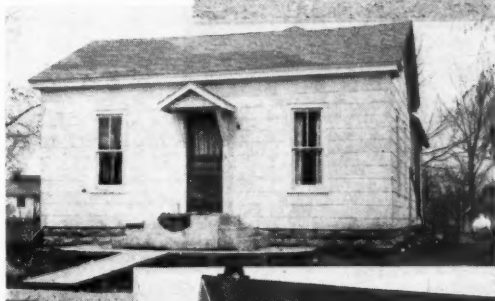
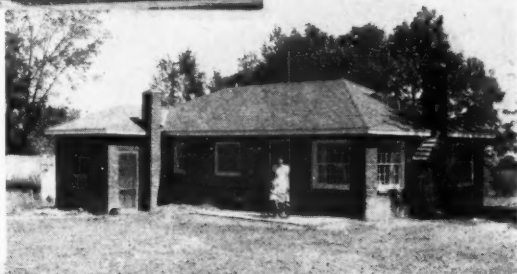
We use the Fisher "Big Joe" for primary regulation and because of the large orifice have never had a freeze-up. Also, the gas we are receiving is dry. We mount each regulator with a Bastian-Blessing line valve for each line leading off. We have taps on each section where we can cut in cylinders or a portable 150-gal. tank in case repairs are necessary. We also have valves between the main tank or tanks and the regulator so that a cut-in may be made there in case we have trouble or if we want to add tank space without a shutdown. Our system is designed so that we may give continuous service. In each case our tanks are located on a good, graveled alley.

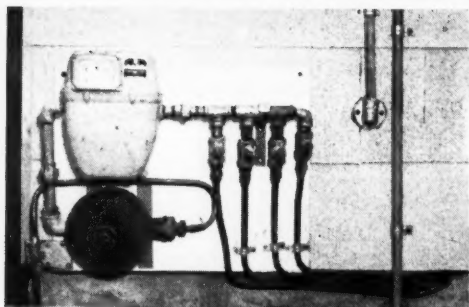
Appliances Help Pay the Freight

In many cases our sale of appliances on a section will pay half of the installation cost. We sell mostly Bryant heating equipment but also use Skelgas appliances and water heaters. Our profit income from the sections now in service is good, and as the system grows it will be better.

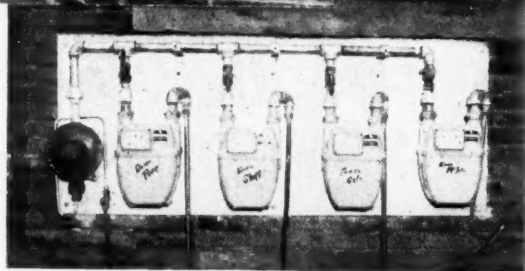
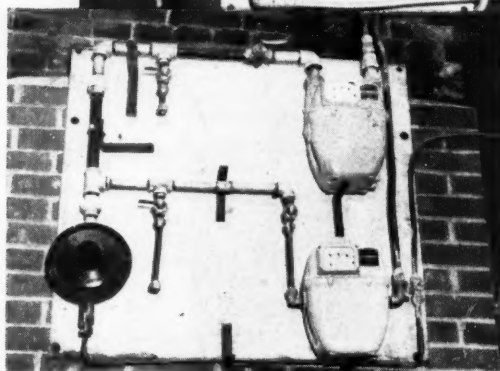
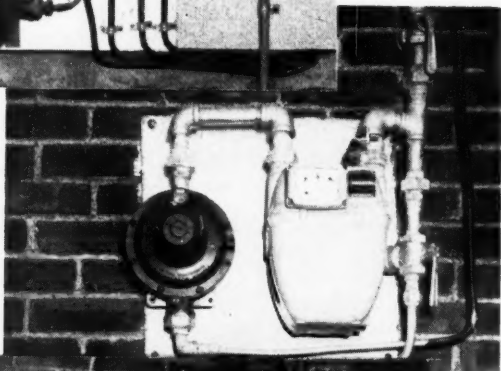
We put in a tap and valve at most lots to avoid future trouble in making taps and to reduce future costs. Next year we will start

Typical Homes with Meter Service





For Commercial Installations



to
ou
pe

A
de
S
m
su
lo
ph

37
ly
ga
ra
fr
Th
m
re

tr
it
ou
bu
pe
pr

IC
Bu

su
th
lat
me
we
ra

sig
Do
Ga
cis
Ga
rit
ga
Ca

DE

to tie some of our groups together, our lines are planned so this is possible.

Our system was inspected by Assistant State Fire Marshal Anderson and Engineer John Knox Smith, of the LPGA, several months ago. They gave us some suggestions which we have followed. We attempt to hold to Pamphlet 58 in all cases.

We have in addition furnished 375-gal. tanks for all of our outlying restaurants and meter the gas to them at less than cylinder rates. This prevents "fly-by-nights" from coming in and stealing them. These jobs will liquidate in 18 months to two years. Meters are read on our cylinder routes.

We have worked hard on our distribution system, and have financed it from our own business, without outside help. We have been in the business for 12 years now and expect to keep growing with the propane industry.

ICC Reduces Official Weight, But Allows Freight Increase

In an early November bulletin issued by Arthur C. Kreutzer, counsel of the LPGA, a report is made upon the latest decision of the Interstate Commerce Commission in regard to official weights for LP-Gases and freight rates. The information follows:

The Interstate Commerce Commission has issued its decision in I & S Docket No. 5440, "Liquefied Petroleum Gas in Official Territory." By this decision the estimated weight on LP-Gas in tanks cars within Official Territory will be reduced from 6.6 lbs per gallon to 4.7 lbs per gallon but the Carriers will be permitted to establish

rates equal to 4b per cent of first class rates. While the suspended schedules embodying the Carriers original proposal of a rate of 50 per cent of first class were cancelled, the effect of this decision will permit the Carriers to maintain the present freight charges.

In reaching this finding, a 5 to 4 decision by the Commission, factors used in reaching previous decisions were largely disregarded and the finding was based on a road-haul cost comparison between LP-Gas and other petroleum products as submitted by the Carriers. The use of the estimated weight of 6.6 lbs per gallon was found unreasonable on shipments between the Southwest and Official Territory as well, but the decision does not prescribe rates from the Southwest to Official Territory stating that further action on this point may be necessary.

The Carriers are thereby given discretion in establishing such rates, which of course may be attacked by the industry if not deemed reasonable. The advisability of filing a Petition for Rehearing in I & S 5440 is now under consideration by LPGA.

The Carrier schedules which would have resulted in the elimination of combination rate factors on tariffs from the Southwest to points in Ohio and Michigan under contest in I & S No. 5605, were withdrawn by the Carriers before the hearing.

Blythe, Calif., Town Plant Switches to Natural Gas

Engineers of the California Public Utilities Commission state that a switch from butane to natural gas will be started immediately under a leasing agreement authorized by the Commission between the Southern California Gas Co. and the Blythe Gas Co., Blythe, Calif.

AVAILABLE GAS SUPPLY SIX TIMES PRESENT DEMAND

THE annual fall meeting of the California Natural Gasoline Assn. in Los Angeles was dedicated to liquefied petroleum gas.

Of the several important papers delivered upon this subject, one, entitled "Propane's Place in the Sun," stands out as of preeminent interest to the LP-Gas industry. It was prepared by T. W. Legatski, assistant director of research of Phillips Petroleum Co., and should forever silence the cries of the fearful that the supply of LP-Gases is limited, that the industry is already oversold and that there is no remaining potential.

The 1947 consumption of 53,000-000 barrels represented less than one-sixth of the supply of that year, Mr. Legatski states, and as far as propane, alone, was concerned, but one-tenth of potentially available supply.

Actually, the potential supply today is 325,000,000 barrels annually—which is fourteen billion, six hundred fifty million gallons! And that's nothing to what can be recovered if the demand for more develops.

These startling but appealing statements make Mr. Legatski's remarks imperative reading.

After reviewing the developments of the LP-Gas industry from the standpoint of small refineries,

and reciting their problems of expansion, Mr. Legatski launches into the essence of his paper under the caption of "Reserves and Availability":

To our knowledge there never have been any real doubts or questions in regard to the potentially available supplies of LP-Gas hydrocarbons. The various independent studies which have been made to arrive at figures for the potentially available supplies all reach the same conclusion, namely, that the supplies far exceed the industry's present needs. As long as we have natural gas supplies—as long as we continue to find new oil supplies—and as long as we continue to refine crude oil and process natural gas, we will have an abundance of LP-Gas hydrocarbons for sale in whatever markets prove to be the most lucrative.

As an indication of what we mean by abundance, some of the most recent estimates on the potentially available butane from the petroleum industry's oil and gas operations at the present level of activity place the volume at the almost unbelievable figure of 163,000,000 barrels annually. Of this

By T. W. LEGATSKI

Phillips Petroleum Co., Bartlesville, Okla.



T. W. LEGATSKI

quantity, roughly 60% is present as a constituent of our well effluents while the balance is produced in refinery conversion operations. Of the total butane available on an annual basis, only about two-thirds is extracted and only about one-third of that which is extracted, some 35,000,000 barrels, finds its way into operations other than gasoline producing operations. Thus, the LP-Gas industry, in its fuel and its specialty outlets, is currently using only about 25% of all butane potentially available.

The propane picture is somewhat different. Our best estimate based on innumerable field gas analyses and of similar analyses of refinery product streams, is that there is at

least one barrel of propane potentially available for each and every barrel of butane available. The proportion for natural gas is somewhat greater but it is largely offset in the final average figure by the lower ratio of propane to butane existing in refineries.

Regardless of what the exact figures might be, it appears from these estimates that the total potentially available supply of propane and butane, including the related unsaturates, is somewhere in the neighborhood of 325,000,000 barrels annually. This figure is believed to be a fairly conservative estimate. When we compare it with the total consumption of LP-Gas in 1947 of some 53,000,000 barrels, we find that we used less than one-sixth of the supply for that year. Furthermore, if we confine our attention to propane, we find that the propane sold as liquefied gas in 1947 was less than one-tenth of the potentially available supply.

Nor is this the whole story! These are only the potential figures for current production and refining operations—operations which are geared to the production of some four trillion cubic feet of natural gas annually and to the production and refining of oil at the rate of some 1,800,000,000 barrels annually. No consideration has been given to the possible changes in the character of our average oil and gas reserves occasioned by deeper drilling. There is a real probability that meeting annual production requirements from deeper horizons will increase the potential volume figures for these gases.

Similarly, no consideration has been given to the effect of a higher

level of operations in the industry on these volumes. The production and refining of oil at the rate of 2,000,000,000 barrels annually will increase these volumes substantially. Increases in the volumes of gas produced for pipe line markets will also have a similar effect. It is probable from a consideration of the present trends in production and refining of oil and gas, that the industry's potential volumes of propane and butane may reach a

figure of 500,000,000 barrels or so within a very short time.

When figures of these magnitudes are compared with current rates of consumption for all uses, it of course becomes obvious that we have barely touched the known supply. These figures should provide plenty of assurance that our chief problem will not be one of supply limitations.

Neither does it appear at this moment that the problem of re-

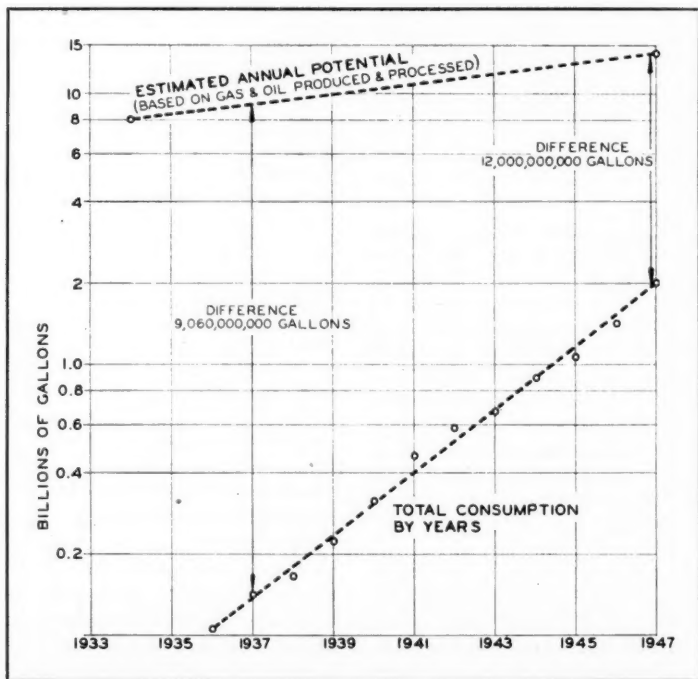


Fig 1. Annual potential vs. annual consumption of LP-Gas.

covering propane in quantity is a serious one for the reason that the bulk of the known supply, probably as much as 70% of it, is a part of our tremendous gas reserve of over 165 trillion cubic feet. A large proportion of the currently produced LP-Gas hydrocarbons comes from the treatment of natural gas for pipe line markets. A large proportion is also produced in the operations on distillate properties and such operations are likewise large scale operations where plant designs can be and are being based on relatively high propane extraction.

Unutilized Source Available

The future for such operations and for natural gas treating operations looks very bright. Much of the new oil production is of distillate character so we can expect more operations of this kind. We can also expect that there will be an increase in the number of operations of the "pressure maintenance" variety which also lend themselves readily to high propane extraction units.

And as to the future prospects in the natural gas pipeline industry, here also will we see continued expansion on at least the same scale as in the past. One of the recent studies of natural gas consumption statistics from 1910 to date revealed, for example, that the consumption doubled with consistent regularity every 11 years. This trend has been particularly pronounced since about 1932 or 1933. The indications from this trend are that a marketed gas production of

around 10 trillion cubic feet can be expected by 1960, or, in other words, a volume two and one-half times the present marketed production.

Those new gas volumes must be processed prior to pipe line transmission and the propane and butane which will be recovered in such large scale treating operations will go a long way toward swelling the currently available recovered volumes of such products. Thus, if the estimated propane and butane contents of these new-to-be processed natural gas volumes alone were recovered, the available product would be at least four times the present LP-Gas consumption. From these various figures and observations it would appear that the recovery of LP-Gas hydrocarbons in quantity is not going to be a serious problem.

Mr. Legatski then reviews the recent developments of the LP-Gas industry to a 2-billion-gallon demand in 1947; discusses its present outlets; the shortages of fuels for current demands due to insufficient refining, storage and transportation capacities; shortages of utilization equipment and appliances, and the bug-a-boo of unbalanced load—all largely familiar to industry men.

He also enumerates the potential demand of the near future as indicated by the great markets for domestic uses, especially house heating and air conditioning; for industrial and chemical fields; for utilities for gas enrichment and standbys; as substitute for manufactured gas, and for LP-Gas town plants. Figures 1 and 2 forcefully

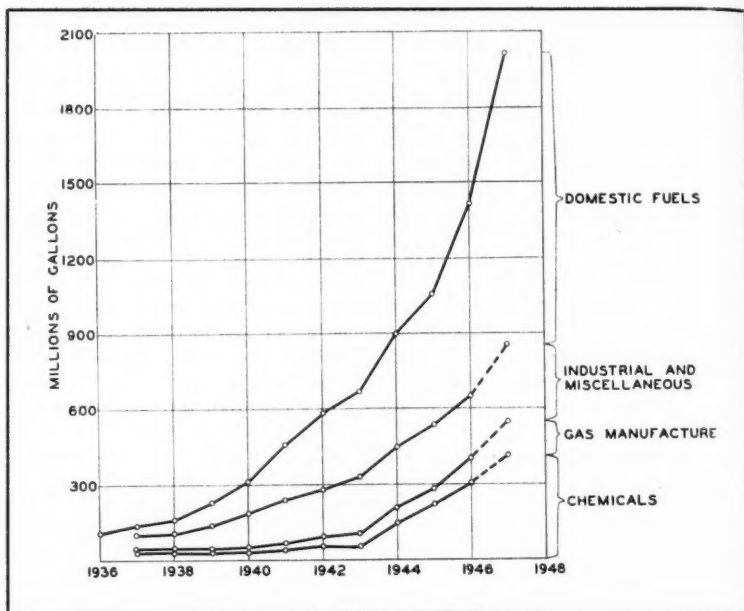


Fig. 2. LP-Gas consumption classified as to use.

illustrate existing and potential markets and production.

In agricultural applications such as flame weeding and dehydration of crops, and in summer air conditioning lie possible balancers of the annual load.

In conclusion, he says:

If, however, our chief interest is not to dabble with the correction of seasonal loads, but is rather to exploit the tremendous untouched stockpile of LP-Gas hydrocarbons, there is still another outlet which at least in some localities has attained real prominence, namely, use of the materials as premium qual-

ity internal combustion engine fuels.

In such an application, particularly if the intent is to utilize the product in pleasure cars as well as in commercial vehicles, the problem of providing distribution facilities has been a real drawback. . . .

However, use of the fuels in commercial vehicles, such as truck and bus lines, city transportation systems, and in similar applications where traffic is over established routes, is an ideal case where the advantages to be gained outweigh the relatively small investment in storage and dispensing.

Streamlining a Bulk Plant

Two Pumps and Two Compressors Can Unload from Tank Car, Fill Tank Truck and Cylinders at Same Time.

AN ingenious system of unloading, piping and pumping, recently installed, has materially increased the efficiency of the propane operation of Lehigh Petroleum, Inc., which has its main bulk plant in Norwich, Conn. Streamlined methods at the location where cylinders are filled and loaded also speed the operation.

Storage consists of four tanks, three of 15,000 gallon and one of 30,000 gallon capacity. From these tanks, the propane is brought underground 700 feet in 3-inch pipe of extra heavy steel to the location of the main plant and office, at which the cylinders are filled.

Until the recent improvements were made, it was impossible to fill a tank truck at the same time cylinders were being filled. The new arrangement, however, makes it possible to unload two railway tank cars, fill one tank truck, and fill cylinders all at the same time.

Formerly it was necessary to check back and forth by telephone, as between a diver under water and the people in the boat above him. If they were filling bottles it would sometimes cut off because

By ED TITUS

at the other location one of the tank trucks was being filled.

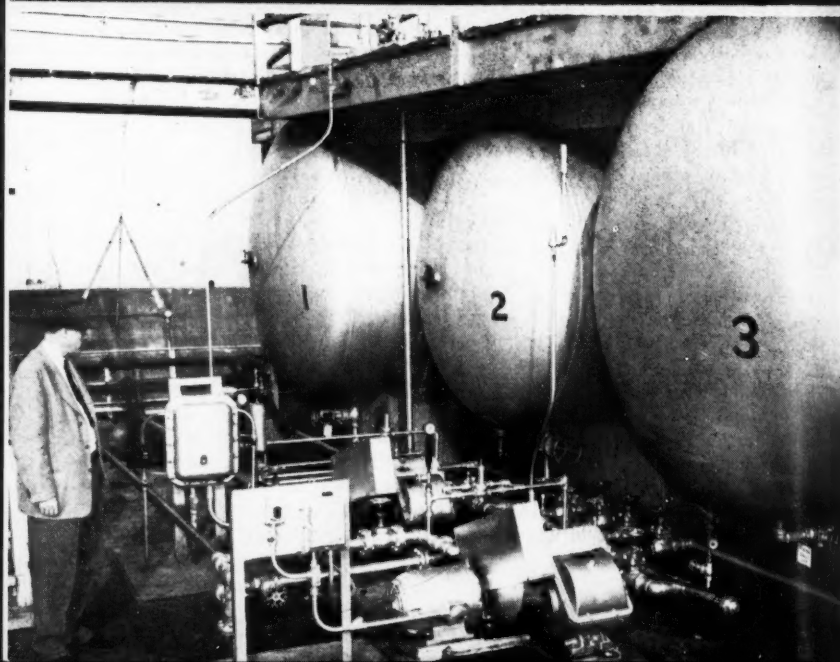
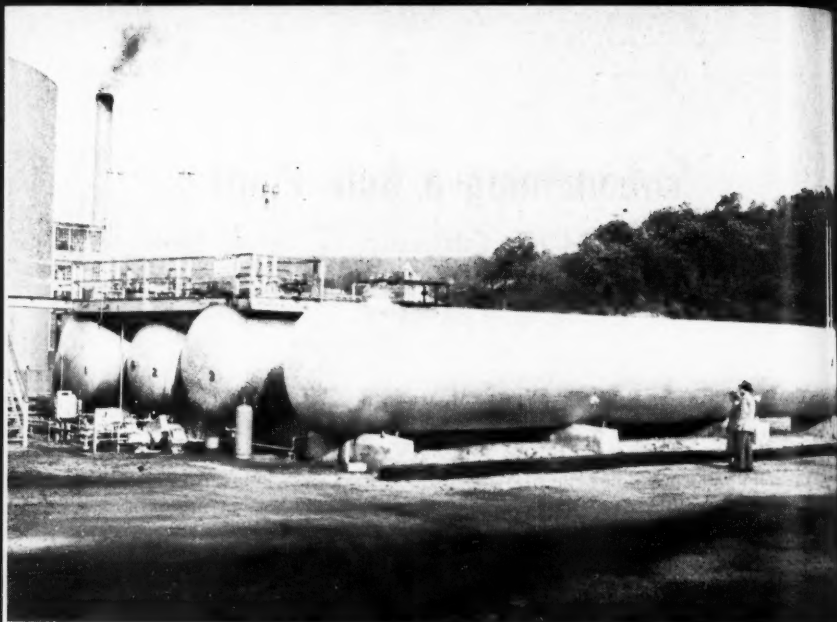
Formerly it was necessary to devote considerable effort to planning the work, and this took time. They always got out the cylinders required, but there was constant interruption.

Under the new systems, the work moves along without interruption. Not only can the present amount of company business be efficiently handled, but the new facilities are capable of handling increased business.

With the new system at the location of the tanks, there are two Brunner compressors and two Dean pumps.

On the suction side there are two pumps on manifold, so that it is possible to use three tanks on either Dean, and one tank on the remaining pump. It also is arranged so that the suction side of the pump is connected to both car unloading towers.

On the discharge side the pumps



are
pla
cha
con
tow
con
tow
ma
tow
fou
pre
tan
or
loa
A
con
tha

I
suc
can
pur
can
to
cou
or
I
Lel
Gov
pla
T
the
abo
ext

OP
plan
Nor
laye
plan
of R
the

DEC

are connected with the bottling plant 700 feet away. On the discharge side the pumps are also connected into the car unloading towers, and into truck loading.

The Brunner compressors are connected with both car unloading towers. There are two 2-inch liquid manifolds from the car unloading towers connected with each of the four storage tanks. Also each compressor is hooked up to unload a tank car at either loading tower or they can have either compressor load or unload tank trucks.

Anything can be done with the compressors except fill bottles, and that has to be done with the pumps.

Truck Pumps Unload Liquid

Matters are also arranged in such way that the tank truck pumps can unload liquid, if desired. The pumps can be used to unload tank cars. And if it were ever desired to load a railway tank car, this could be done with either the pumps or compressors.

Irving Slosberg is treasurer of Lehigh Petroleum. Arthur McGowan is manager of the Norwich plant.

The arrangements for handling the gas for efficiency described above were developed to a large extent by Louis R. Wenzel, vice

president of Gas, Inc., subsidiary of Lowell Gas Co., Lowell, Mass., with the cooperation of Edward Howard, at the Lehigh plant in Norwich.

In addition to the system described above for handling the gas efficiently, various streamlined improvements have been worked out at the place where the cylinders are filled. The filling is done automatically.

The company does not regard the methods as final, and is still working for improvements.

Cylinders Carried on Conveyor

There is a horizontal conveyor system, with the gradual ramp. The cylinders are carried in a horizontal position to the point where they go through a water spray paint booth. Then they are carried vertically to the bottling scales, and then vertically again to the point where a fork lift picks them up and takes them to the trucks, or to the loading platforms.

The whole procedure appears to apply assembly-line methods to the business of filling and getting the cylinders away in the most efficient manner.

In addition to its main plant and office in Norwich, Lehigh Petroleum, which handles "Essotane," has offices and distribution points in Putnam, Stafford Springs, Middletown, and New London, Conn. The cylinders are taken to these points for distribution. At Ware, Mass., the company has an 18,000 gallon bulk plant.

OPPOSITE PAGE (Above): Bulk plant of Lehigh Petroleum, Inc., Norwich, Conn. **Below:** The piping layout at the Lehigh Petroleum plant with Ed Titus, eastern editor of BUTANE-PROPANE News giving it the once-over.

Increasing the Safety Factor In Truck Tank Design

By SI HEDLUND

Sales Manager, Propane Gas Equipment Division,
Black, Sivalls & Bryson, Inc., Kansas City, Missouri

THE problem of increased safety factor as well as increased economy of operation is the continual study of designers and manufacturers of truck tanks for the transportation of butane and propane, commonly referred to as liquefied petroleum gases. At least, we are safe in saying it is a continual problem with our company, wherein we have recently developed a standard truck tank (Fig. 1) that more nearly meets the safety factor and the economics required by the industry.

When we stop to realize that approximately 90% of the serious and often fatal accidents that have occurred with liquefied petroleum gas were caused directly or indirectly by some undue stress or strains in the piping arrangement on trucks or the unsatisfactory op-



SI HEDLUND

eration of relief valves, or the failure of proper operation of self-closing valve equipment, and in a few cases the design of the tank itself, we can then appreciate how important it is that design and proper construction should be everlastingly sought.

Safety Considerations Come First

While operating efficiency is desired, the design and construction for safety should have preference over every other consideration in building units merely to meet a price situation. This was the dominating thought the writer had in mind during all of the months of planning, designing and constructing the standard tank about to be described.

The tank itself was designed to use improved safety valves, improved self-closing discharge valves which will soon be on the market, the present excess flow valves, the diminution of repairs to all valves located on the tank, proper cleaning and inspection of the tank, and

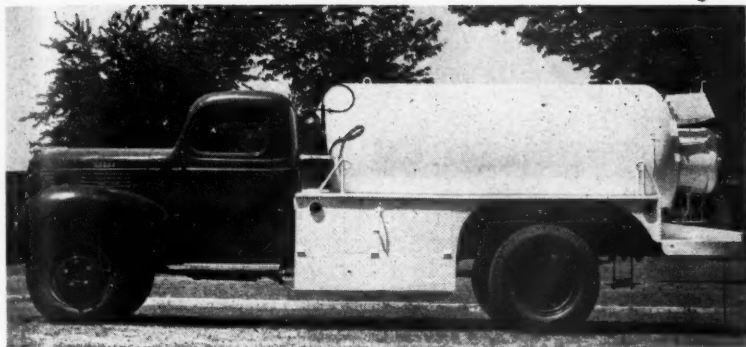


Fig. 1. Truck tank design standardized by Black, Sivalls and Bryson, Inc.

pertinent equipment installed on the tank.

A manhole designed with a minimum of weight will render service in this respect. Fig. 2 shows one particular truck photographed inside the tank through the manhole. This truck has been in service since 1939. The photograph clearly indicates how necessary internal cleaning is.

The manhole on this tank was just recently removed to install a side outlet discharge opening after the truck had upset and had been brought in for remounting. The flaky grit shown was very pronounced throughout the interior of the tank and was in the form of a growth, or a form of barnacle, and could only be removed by grit blasting. After removal it was learned there was no corrosion, but such foreign matter could prevent excess flow valves, relief valves, line valves or self-closing valves from operating properly, as well as cause

unnecessary wear or tear on the truck pumps. It has often been mentioned by operators that unclean tanks cause expensive valve repairs and require much more attention.

The installation of a manhole and periodical cleaning by the operator will eliminate the need for a strainer between the tank valve and the pump. This increases pump efficiency and means less pressure drop to the suction side of the pump and hence, less "starving" of the pump. This manhole is an aid to the manufacturer in performing the best work in grit blasting the inside of the tank. The baffles are arranged so that the center sections are removable and give a greater access to the working crews and a perfect cleaning thereafter.

The combination of both manhole and grit blasting is an aid to the worries of pump manufacturers, some of which are offering gear pumps to the trade with extremely close clearance of the working

parts. Thereafter it is the tank manufacturers' problem to offer tanks to the trade without scale or dirt of any kind on the inside of the tank.

As the industry progresses there will be better and newer forms of self-closing valves presented to the market. The manhole will also provide for this and it is our view that most of such changes could take place on the manhole cover itself without changing the tank; then the truck operator's problem of a costly shut-down would be minimized. If future changes are necessary to the tank itself, any tank manufacturer would appreciate the opportunity of being able

to weld inside as well as outside of the tank.

Proper Size

The size of the tank selected must be proper for most of the conventional trucks now on the market, to provide ample pay-load for the operators, to operate under all sorts of weather and road conditions when deliveries are more frequent, with the consideration for unnecessary weight, must comply with all state laws, and be adaptable for replacement on new trucks.

A 1000-gallon pay-load propane tank requires a water capacity of 1220 gallons and the best dimensions to suit this capacity and mounting on an ordinary 156" wheelbase ($1\frac{1}{2}$ to $2\frac{1}{2}$ ton trucks) is a single tank, 54" diameter and approximately 11'-2" overall. The tank will then be adaptable to any cab-over-engine type truck of 132" wheelbase. This size has proven to be very popular.

Road Conditions

The units should be constructed in such a manner that they may be handled properly during the winter months over unpaved roads and during adverse weather or when demands for servicing are more frequent. Twin tanks, with the load extending over the wheels bog down in the mire easier than the single barrel tanks. It should be the effort of the designer to have the bottom centerline of the tank as close to the truck frame as possible to prevent overturning on curves. Too much tank or truck is a detriment because the operator is then confronted with weak culverts

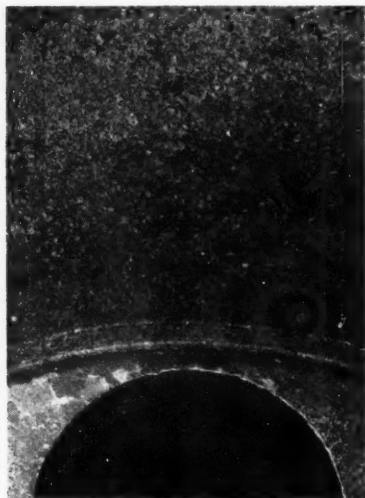


Fig. 2. Interior of tank. Flaky grit is shown deposited on walls, possible source of trouble unless removed.

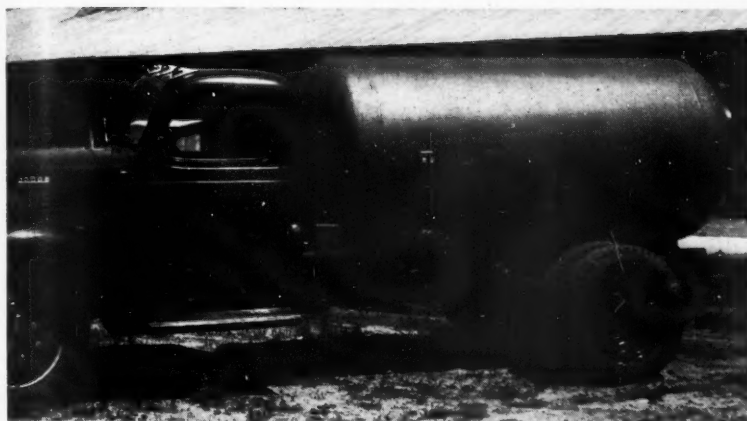


Fig. 3. Elliptical head tanks are lighter but cost more.

under soft ground. There is also the problem of passing over bridges safely. Many times trucks have gone through bridges and culverts due to having too large a pay-load and it is false economy for anyone to attempt to operate under these conditions.

State Laws

Besides being built to the rules and regulations of the National Board of Fire Underwriters, some states demand certain improvements or certain fitting locations, or sizes or location of relief valves. Objections have been registered by some states on the manner of pump mounting within the truck channels, and these requirements make the designer's problem complicated. On this particular tank, most of the changes required by states take place in the manhole cover, which can be made interchangeable from

one tank to another by us. There are no changes required on the tank proper; therefore, we are in a position to standardize on this part of the equipment.

State enforcing bodies have become aware of the dangers caused by undue strains on the piping connected from the tank outlet to the pump inlet, particularly when the pump is mounted within the frame of the truck. A recent accident was traced to this cause. Only a slight collision was sufficient to split an over-strained pipe to cause a wild flow, and the after-fire, with injuries and fatalities to bystanders. These conditions must be corrected by the designers. Other enforcement bodies have deemed it necessary to have the pump mounted outside of the truck channels so it will be more accessible for repairs and inspection, particularly to the pack-

ing, and more remote from the exhaust pipe.

Replacement on a New Truck

The mounting of the tank to the truck should be secure and protected against shifting of the tank, and so designed as to be easily removed from one truck to another, as in the case of a new truck after the life of the old truck is gone. By having the pump and piping integral with the tank, the operator has the advantage of moving the tank, pump and piping as a unit with a minimum loss of time and without any disconnecting of the parts. The selection of a pump, therefore, should be a type which would outlast the truck.

Adaptable to Any Choice of Body Work

Some operators desire streamline mountings, others prefer simple skirting with the elimination of as much weight as possible. If the choice be streamline, then heavier trucks should be provided for the extra weight. Sufficient lugs or attachments should be provided on the tank itself so that the body builder can work to these parts. Because truck tanks should be stress relieved and magnafluxed, it is important that no further welding be done on the pressure parts of the tank by anyone other than the manufacturer of the tank. By having sufficient lugs and brack-

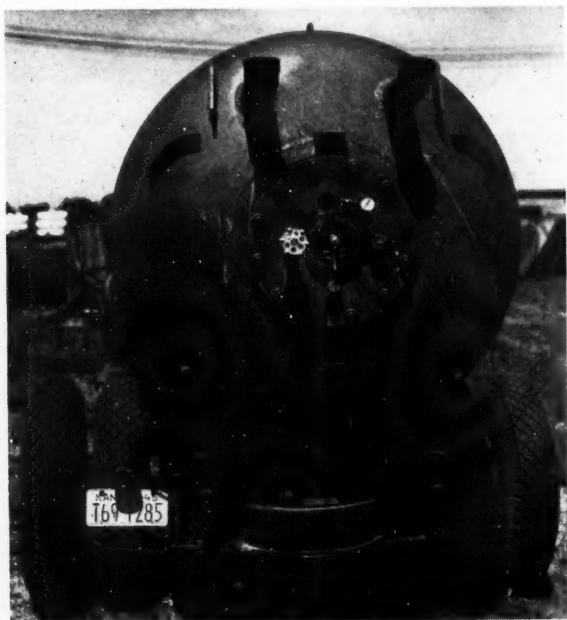
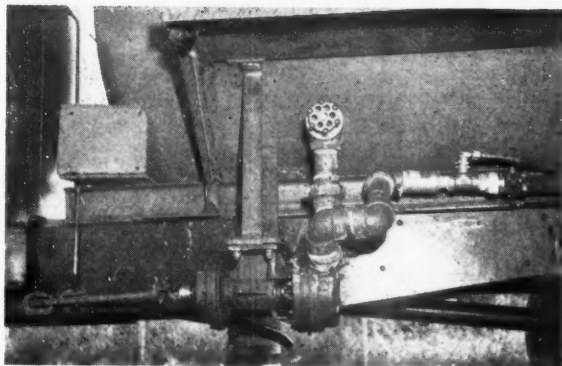


Fig. 4. Note valve and manhole in rear. Also, the two relief valves, which are provided with inside piping to the top of the tank.

Fig. 5. This Corken pump eliminates transmission equipment between the pump and the power take-off.



ets to suit the various types of body work, the operator can choose any mounting, or make changes to his desires later.

Design of Tank Proper

To save unnecessary weight the tank should be designed with the use of high strength steel, 70,000 pounds tensile strength. The welding of this particular grade of steel is subject to incipient cracks along the fusion zone, but is minimized by preheating. Therefore, it is necessary that 70,000 pound tensile strength steel used in truck tanks be stress relieved and later magnafluxed to result in the best and safest tank. Such tanks are usually built to Par. U-69 and prove to be the most economical. However, a saving of 7% in weight of the tank can be realized if the vessel is built to ASME Par. U-68, which requires X-Raying of all of the shell seams. The welding around the integral manhole must be X-Rayed in any event.

The weight of the tank shown in Fig. 3, built to U-69 and with ellipsoidal heads, is 4200 pounds. However, the choice of the heads can be the ASME flanged and dished, but this change would result in more weight per gallon, but less in price. For overall appearance, the elliptical head is favored. The recent application of automatic submerged arc welding also adds workmanship and appearance to the tank. All parts of the manhole are high strength steel to reduce the weight as much as possible. Manholes stud-bolted as indicated in Fig. 4 do not leak when properly bolted in place.

Choice and Design of Relief Valves

This is one of the most important requirements. The location should be arranged so there is no danger of a valve breakage or valve failure when the truck turns over. The valves can be submerged in the top centerline of tank or located in the rear as shown in Fig. 4. This

photograph shows two relief valves located in the rear of tank 16" apart. Both discharge the gases vertically. Both are provided with inside piping to the top of the tank, however, not towards the center.

The purpose of arranging the valves so far apart is for a safeguard in the event of fire, with the probability of the truck turning over on its side.

The maximum loading of propane is 83% of the actual capacity of the tank, and it is assumed that the most dangerous condition would be for the tank truck to catch fire after the truck is upset, later causing the truck frame and the supports of the truck to become affected and weakened by the blaze.

Naturally, the fire would increase the pressure of the gas and both valves would probably pop. If the tank were loaded to the maximum, both would discharge liquid, provided both valves were in good condition. This is always a dangerous condition and is the prime reason why two relief valves should be selected, even though only one would conform to the rules of any state.

Each valve (see Fig. 4) is approximately twice the required capacity but well needed if only for this one particular and dangerous condition. By having the relief valves apart, as they are, and by reason of only 83% filling density permitted, there is the protection to the owner that one valve will

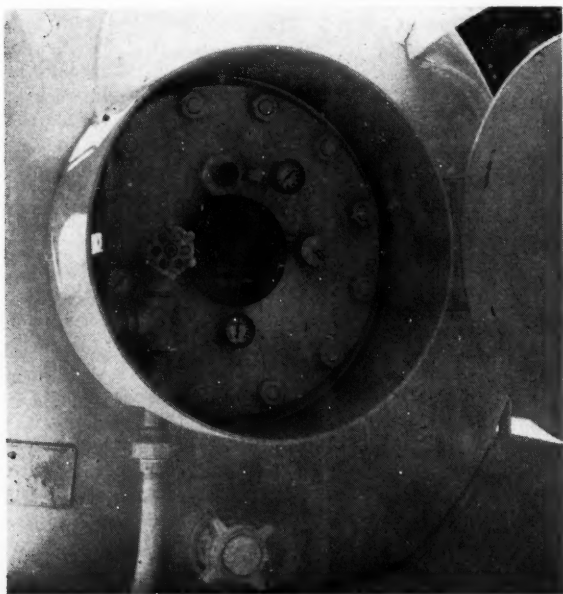


Fig. 6. The pump return valve is located on the manhole cover at the left of the center rotary measuring gauge.

reach the vapor quicker than the other as the liquid level is diminished. When the uppermost valve reaches the vapor, there is sufficient relief area in this one valve to protect the tank against rupture.

Under all conceivable conditions, two relief valves will give better protection than one, and this thought should be entertained by all truck tank designers if only for the simple reason that permanent storage tanks are protected against overturning by reason of concrete or masonry supports, or fireproofed steel supports. Drains should be provided on all relief valves, and loose rain caps placed over them.

Simplicity of Pump Mounting

The piping should be free from strains caused by the swaying of the truck and the heavily loaded tank on the highways. A unique method of mounting the pump directly to the tank eliminates this condition, particularly if the tank outlet is tangential and as close to the bottom as possible. The outlet is only several inches higher than the bottom, and has an oversized dip tube extending to the bottom on the inside. The pump is mounted directly to the tank valve or to a tee connected thereto, eliminating pressure drops through elbows or piping, or strainers which we have also eliminated because of the position of the outlet and grit blasting on the inside.

Hose which is treacherous is the usual answer to strains and leaks in piping. Most of our customers use armoured flexible pipe, which is a great deal better. With the

minimum of piping, the excess flow valve on the outlet has a much better chance to function.

The outlet is located near the front of the tank which gives the operator the advantage of being able to empty his tank more completely, and this pays dividends over a short period of time. As a truck empties, the load is released from the rear truck springs and the drainage is toward the front. There is also an advantage in having the outlet on the left hand side, or on the driver's side of the truck. The driver then has the tank valve closest to him, so he can close it quickly if necessary.

In the writer's opinion, all of his operations should take place at this location, with the hose box or reel at the same location, because then the driver can observe if his hose is back in place with the doors closed, etc., before driving off for his next stop. This is particularly important if two men operate the truck, as there could be confusion on each thinking that the other had disconnected, etc., to complete the service. One fatal accident did actually happen from this cause, so if the tank outlet, hose, etc., were on the left hand side the driver would notice that everything was in order before driving off to the next stop.

Selection of Pump

The pump shown in Fig. 5 is a Corken Model No. 50, turbine type, operating at a base speed of 1500 RPM. The pump has incorporated within itself a 4.1 to 1 speed increaser, thereby eliminating trans-

mission equipment between the pump and the power take-off.

The pump selected should be able to give sufficient differential to pump propane into large or small storage tanks with small sized filling connections down to bottle filling valves, and do the work any time of the year, particularly during the summer months when the vapor pressure of the domestic tanks to be filled is 10 lbs. to 20 lbs. higher than the vapor pressure on the truck tank. If the equipment can handle this with sufficient volume for larger filling connections, the same equipment would handle any other type of filling.

Tests have given differential pressures as high as 100 lbs. which is much more than required. Therefore, it is now assumed that the problem of filling aboveground propane tanks through small openings and without vapor return connections will no longer be a problem with operators.

Similar turbine pumps were installed by us as early as 1938, and to the best of the writer's knowledge, are still in service. Vapor locks, or spinning the pump when the tank is empty, and the normal carelessness by drivers handling pumps are not particularly injurious to turbine pumps as they would be on gear pumps.

Pump Return

This should be provided on every truck tank. This valve is shown on the manhole cover (Fig. 6) to the left of the center rotary measuring gauge. We simply call it a pump return valve, to provide for a by-

pass line from the pump back to the truck tank. The discharge back to the truck tank takes place above the liquid level. The operator can prime his pump with it, can crack off vapors in the line from the pump or vapors in the pump at the start of the pumping operations.

Because the pump is 50 GPM this by-pass can be opened to allow a stream of fluid back to the truck tank, particularly when filling small systems provided with small openings. For this kind of service a large pump is then overrated, but this condition can be controlled by "cracking" or opening the tank valve sufficient to give the best pumping control.

Rotary Gauge

The large rotary gauge (7" diameter dial at center of manhole cover) affords more accuracy in gauging the contents of the tank. Figures are on both sides of the dial. If the truck is not on level pavement, the contents can still be checked by averaging the figures on each side of the dial.

Other Valves

The fill valve on the righthand side of the rotary gauge (Fig. 6) also discharges above the liquid level. This is designed to protect the filling hose against reversal of flow. By discharging above the level of the fluid, the check valve is better protected from freezing open when hose is disconnected. If this should happen, the only liquid discharge from the tank would be the contents of the inside pipe, and not particularly dangerous.

The vapor opening above the

rotary gauge is 2" and this opening continues on the inside to the top of the tank. This larger than usual opening is provided for the various vapor valve assemblies required by the several states, or to provide withdrawal of vapors when the truck tanks are filling by vapor compression methods.

The pressure gauge is tapped into this same header and protected against excess flow by a No. 54 drilled hole on the inside of the manhole cover. A dial thermometer is provided below the rotary gauge.

Considering the cost of operation and present labor turnover faced by the operator, the writer believes that the added protection offered by this design will prevent accidents known to date.

The industry is demanding these practical improvements that will contribute in greater degree of economy of operation and increased safety efficiency during the post-war period. National associations are now educating their members, and major refineries are encouraging inspection of the mobile equipment. State enforcing agencies are doing a good job of correcting or rejecting unsafe liquefied petroleum gas tank equipment.

New Brunswick Firm Installing \$100,000 Bottling Plant

Formation of a new company—Sumner Propane Gas Ltd.—for the bottling and distribution of gas in the city of Moncton, New Brunswick, has been announced by H. L. Hill, general manager of Sumner Co. Ltd., of Moncton, the parent organization of the new company. The new plant

is expected to cost \$100,000, will be the first of its kind in the Maritime Provinces and is aimed at ending the acute shortage of gas which has been prevalent in the Moncton area for some time.

Mr. Hill said it is planned to open up dealerships throughout the Maritime Provinces to distribute the fuel and operations were expected to begin before the end of October. A uniform sales policy will be adopted which will assure the customer of receiving propane at a reasonable price. The advantages of the fuel will be brought to rural as well as urban users.

Permission has been given by Moncton civic authorities for the construction of a storage plant for the gas and the federal government has granted permission for the expenditure of the necessary United States funds for imported equipment.

The plant will be located at the Victory Industrial Center—the wartime Royal Canadian Air Force depot—and will necessitate the installation of a 30,000-gallon storage tank for liquid propane. The tank is being brought from the United States on two flat cars and weighs more than 70,000 pounds. It is 67½ feet long. A new building will be constructed to house the special gas compressors and pumps and the bottling equipment.

A qualified engineer will be in charge of the new plant. He is William Firmer, who has had long experience in the propane field. Servicemen are being trained to make the necessary installations for domestic use, generally consisting of a 2-cylinder operation, to be used for cooking and hot water heating.

Equipment for the bottling plant is now on the way to Moncton and operations will begin as soon as possible after its installation.

The Best Place to Sell: Ahead of the Electric Lines

LP-GAS distributors looking for guides to use when considering expansion of their sales activities would do well to study a recent informational bulletin put out by the Rural Electrification Authority. The bulletin shows the percentage and number of unelectrified farms in each state, and adds each state's statutory allotments for REA loans during fiscal 1949—a reasonably clear indication of where electrification expansion may soon be expected.

The REA bulletin has been sent to members of the LPGA, and in the association's accompanying bulletin notice is taken of the fact that

a recently completed electric manufacturing plant is set for a productive capacity of 624,000 electric ranges per year.

Breaking down the figures in the REA bulletin, it is found that in the eight states of North Dakota, South Dakota, Mississippi, Nebraska, Oklahoma, New Mexico, Kentucky, and Montana more than 50% of the farms are unelectrified, while 15 states are in the 50-30% unelectrified bracket, 12 in the 30-10% bracket, and 13 vary from 2.4% (Ohio) to 10%.

National ranking of states, with number and percentage of unelectrified farms are shown in Table 1.

TABLE 1. UNELECTRIFIED FARMS

State	Farms Without Central Station Electric Service 6-30-48		Farms With Central Station Electric Service 6-30-48		Statutory Allotment for Loads During Fiscal 1949
	50% plus	% of Farms Unelectrified			
North Dakota	53,641	77.2	15,879	\$ 5,831,520	
South Dakota	52,300	76.1	16,405	5,685,740	
Mississippi	164,408	62.4	99,120	17,873,420	
Nebraska	62,810	56.2	48,946	6,828,320	
Oklahoma	92,121	55.9	72,669	10,014,820	
New Mexico	15,701	52.9	13,994	1,706,920	
Kentucky	120,800	50.6	117,701	13,132,620	
Montana	18,910	50.1	18,837	2,055,780	

TABLE 1. UNELECTRIFIED FARMS—Continued

50-30%				
Kansas	70,031	49.6	71,161	7,613,340
Tennessee	115,108	49.1	119,323	12,513,820
Wyoming	6,205	47.5	6,871	674,560
Missouri	113,228	46.6	129,706	12,309,440
Arkansas	90,718	45.6	108,051	9,862,300
Louisiana	57,737	44.7	71,558	6,276,800
West Virginia	42,744	43.8	54,856	4,646,860
Nevada	1,407	41.0	2,022	152,960
Alabama	87,587	39.2	135,782	9,521,920
Florida	21,184	34.6	39,975	2,303,000
South Carolina ...	50,927	34.5	96,818	5,536,460
Texas	127,546	33.1	257,431	13,866,000
Georgia	72,084	31.9	153,813	7,836,520
North Carolina ...	90,967	31.7	196,445	9,889,360
Minnesota	58,574	31.0	130,378	6,367,800
30-10%				
Virginia	46,324	26.8	126,727	5,036,060
Maine	9,611	22.8	32,573	1,044,840
Colorado	9,609	20.2	38,009	1,044,640
Iowa	41,578	19.9	167,356	4,520,100
Utah	5,171	19.6	21,151	562,160
Arizona	2,565	19.5	10,577	278,860
Vermont	4,731	17.9	21,759	514,320
Illinois	32,298	15.8	171,941	3,511,240
Delaware	1,422	15.3	7,874	154,600
Wisconsin	26,397	14.9	151,348	2,869,720
Maryland	5,900	14.3	35,415	641,420
Pennsylvania	17,609	10.3	154,152	1,914,340
10-0%				
New Hampshire ..	1,693	9.0	17,093	184,060
Washington	5,172	6.5	74,715	562,260
New York	9,211	6.2	140,279	1,001,360
California	7,315	5.3	131,602	795,240
Idaho	2,202	5.3	39,296	239,380
Oregon	3,031	4.8	60,094	329,520
Massachusetts	1,487	4.0	35,520	161,660
Indiana	6,919	3.9	169,051	752,180
Connecticut	821	3.7	21,420	89,260
Michigan	5,841	3.3	169,427	635,000
New Jersey	753	2.9	25,473	81,860
Rhode Island	99	2.7	3,504	10,760
Ohio	5,196	2.4	215,379	564,880
Average U. S.		31.4		



LEFT TO RIGHT: Jack Kjerner, president, American Gas Conversions, Inc.; Ivan Arnold, assistant supervisor on Sherbrooke conversion job; Vincent Dworak, field supervisor, and service truck on the Sherbrooke job. BELOW: Serviceman making conversion of a manufactured gas range to burn propane-air.



T
da
st
co
su

er
uf
sta
th
Ar
su

me
wa
ing
45
for
ope
rea
tem
oth
cos
?
rep
gro
hol
scr
ing
cos
pla
100
dou
stal
Pac
T
30,0
tan

DEC

Convert 6000 Meters

From Water Gas To Propane-Air

THE first major propane-air plant to serve an entire city in Canada, and one of the largest such installations on the North American continent was in operation last summer at Sherbrooke, Quebec.

Propane-air is reaching consumers unmixed with natural or manufactured gas. The plant was installed by Pacific Gas Corp., and the conversion job was handled by American Gas Conversions, Inc., a subsidiary of Pacific Gas.

The new plant, serving over 6000 meters, is completely replacing the water-gas equipment, and is sending out gas of 900 Btu instead of 450 Btu. Decision to replace the former system of this municipal operation with propane-air was reached by Gaston Masse, superintendent of gas and electricity, and other city fathers, after a study of costs and performance.

The city faced the necessity of replacing the old system from the ground up, beginning with a new holder and extending to boilers and scrubbing, condensing and purifying equipment. One estimate of the cost was \$400,000. The propane-air plant, capable of producing up to 100/MCF per hour of gas with double the old Btu value, was installed at a saving estimated by Pacific Gas Corp. as \$250,000.

The plant now consists of three 30,000 gallon propane storage tanks, an 8 x 50 surge tank, and

two PGC vaporizer-mixers, each capable of producing 50/MCF per hour. Inasmuch as peak loads are in the neighborhood of 65/MCF per hour, the new plant provides ample reserves against unforeseen demands.

A special unloading header is located at the railroad siding with interconnecting loading lines to the storage tanks. There is a 5 hp repressuring vapor pump housed separately; an 8 x 24 Roots-Connersville station meter; and a Cutler-Hammer thermometer.

The system was designed to use a governor to maintain a positive pressure in the distribution system at all times. The vaporizer mixers are capable of producing a 3-pound gas at 900 Btu that is directed through the governor and there reduced to approximately 10 inches, the proper pressure determined by the fact that there was no regulator in the entire Sherbrooke system.

Pacific Gas Corp. had agreed to deliver sufficient propane to operate the installation, but withdrew from the supply phase when Shell Oil Co., Montreal, undertook delivery.

The public relations phase of the changeover to propane-air was given careful attention. To an-

nounce the opening of the new plant, the city council took full page advertisements in both Sherbrooke newspapers explaining that gas burning appliances would require converting over to the new gas. This phase of the work was under the supervision of John Kjerner, president of American Gas Conversions.

The consumers were told that the city had been divided into 17 sections and that the conversion would be handled one section at a time, so as to complete the entire project with the least possible inconvenience. Each section, it was estimated, would require about three days for completion.

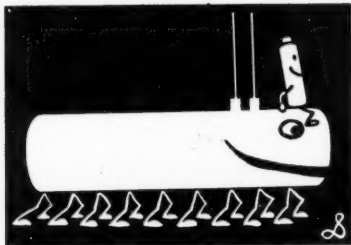
The advertisement said, "A week before your section is reached, you will receive a card of instructions, and you will be notified of the time for conversion of the appliances in your home. You will be furnished with complete information for operation of the appliances during the changeover period."

Local press and radio told residents why the conversion was neces-

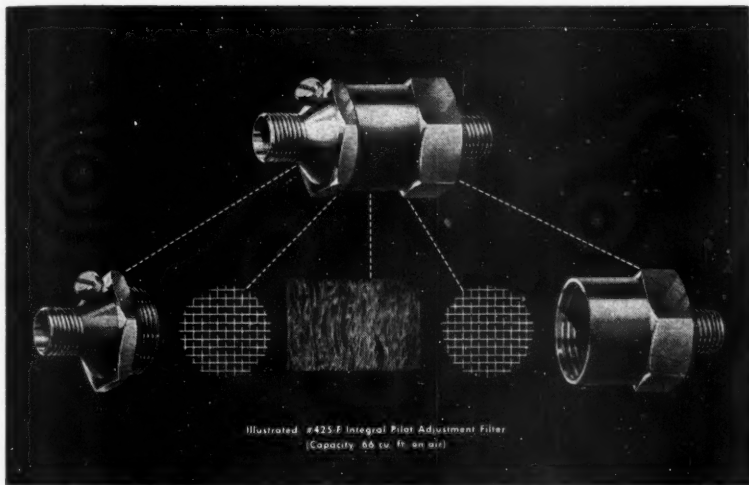
sary and repeated the assurance of the City Council that the work would be completed with a minimum of inconvenience.

Consumers were told that a crew of 25 conversion technicians had flown in from the States and that 25 or 30 Sherbrooke men would be hired and trained to assist in the work. The local papers also printed news stories of the AGC conversion truck, a mobile workshop-on-wheels that had been driven from New York for the job.

Since French is the principal language spoken in Sherbrooke, most of the public relations work had to be done in that language. Considerable excitement was caused by the changeover, as citizens discussed the effect of "le gaz propane." Various prominent Canadians attended the ceremonies at which the plant was inaugurated. They included the Rt. Hon. Louis St. Laurent; J. S. Bourque, Minister of Lands and Forests of Quebec; Stanley Hayes, American Vice Consul at Montreal; Guy Bryant, Mayor of Sherbrooke, and others.



Protect Your Gas Appliances With Wyman Gas Pilot Filters



● Pilot outages due to gum and dust particles and the expensive service calls they entail will be things of the past after you equip your appliances with **WYMAN GAS PILOT FILTERS**. They are simple to install, and they require *no subsequent servicing*, a fact recognized and appreciated by utilities and *dealers* everywhere.

Wyman filters assure years of effective service because of the simple basic design, precision construction and scientific testing that are inherent qualities of each filter in the line.

There are only a few parts to each Wyman filter—all corrosion-proof—each made to precision standards to insure perfect fit. Extreme care is taken in assembly, each unit being individually packed, flow-tested and then pressure tested to make sure it is gas tight and has the proper capacity.

There is a Wyman **GAS FILTER** for every constant burning gas pilot. Send us the Btu rating of the pilots you use. Samples together with complete information and prices will be sent you promptly. Write today!

Harper-Wyman Company, 8563 Vincennes Ave., Chicago 20, Ill.

DECEMBER—1948

Properties of LP-Gas to Consider for Proper

Burner Adjustment

In Two Parts—Part 2
(Part 1 in September issue)

By C. C. DUDLEY
Skelly Oil Co., Kansas City, Missouri

Gas Supply to the Appliance

We must give some thought to supplying gas to the appliance. Assuming that the proper size gas container and pressure regulator has been selected, it is still very important that the proper gas pressure be maintained at the appliance. A long run of small size pipe between the regulator and the appliance may furnish enough gas to operate part of the burners but when all burners are in operation the pressure may drop to such a point that poor combustion will be obtained. Tables 1 and 2 show pipe and tubing sizes which our firm uses.

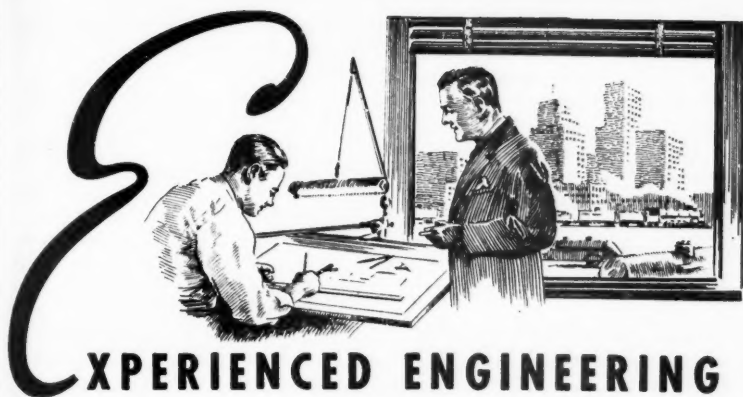
If you compare this data with other tables which you may have or that have been printed, you may think that we are too insistent upon using large lines, but this table has been figured so that the pressure drop due to friction is nil. Some of the tables show that you can put a certain quantity of gas through a certain length of line with, we will say, $\frac{1}{2}$ " of pressure drop. Our idea is to have lines of such size that allowances for pressure drop can be forgotten.

Since gas pressure to the appliance has such an effect on the operation of the burners, it should be

carefully checked. Until we started using LP-Gas for illumination we had very little success of getting the importance of gas pressure to our men. They couldn't see but what a range operated about as well if the pressure was an ounce low or an ounce high, but when they went to service lights they found that gas pressure was important. Low pressure on a light underrates the burner and the mantle will not be filled with flame and a dim light is the result. High gas pressure will overload the burner and the flame will be short on primary air, causing soot to form on the mantle.

We will not discuss Servel refrigerators, but if you have studied their service manual, you know that they stress the importance of proper gas input to the burner and gas pressure has a great deal to do with the amount of gas that passes through an orifice.

Spud orifices also have a great deal to do with the amount of gas that is admitted to the burner. A spud is usually referred to as a small metal piece which has a hole in it for the purpose of metering



EXPERIENCED ENGINEERING SERVICE

When Butane and Propane were first released for commercial and domestic use, this company had a worldwide reputation for the manufacture of quality built petroleum tank fittings. This company had the "know how" in all types of safety, conservation, measuring and handling equipment. With the phenomenal expansion in the uses of L.P. Gases, S. & J. engineers have kept abreast of developments, first at the refinery level; thence in the field of distribution, on land and by sea. When you contemplate expansion of storage facilities or delivery equipment, ask us about the fittings you will require.

SHAND & JURS CO.

BERKELEY, CALIFORNIA

NEW YORK

CHICAGO

HOUSTON

LOS ANGELES

SEATTLE

S H A N D & J U R S

DECEMBER — 1948

83

and directing the stream of gas into the mixer of the burner. The orifice is the small hole through which the gas flows. There are quite a number of different shaped spuds, but their exterior shape is of very little importance, at least so far as gas flow is concerned, but the rate of gas flow is effected by such conditions as the following:

- A. Gas pressure.
- B. Diameter of orifice.
- C. Length of orifice.
- D. Finish of orifice inside.
- E. Angle of approach to orifice.

Perhaps some of you have orifice capacity tables, but in case you do not, they can be found in the Handbook Butane-Propane Gases, Page 198 of Third Edition.

If we were handling appliances with adjustable orifices it would be necessary to meter the gas to the burners so that they would be properly rated, but since we use a fixed orifice and can control the gas pres-

sure it is a very simple procedure to provide the proper gas input to each burner. All appliances have been carefully engineered so that each burner is to get a definite quantity of gas and in most cases you are just kidding yourself if you change the input rate and expect to save gas.

Whenever the input rate is reduced, the amount of excess air in the products of combustion increases rapidly and the stack loss is greater. Increasing the input rate is just as bad, but also dangerous, because you may get incomplete combustion and carbon-monoxide will be produced. To be safe, make sure that each burner is properly rated.

I have taken a lot of time talking about combustion, burner operation, spuds, orifices, gas pressure and a number of related subjects, but I feel that this information is necessary before we attempt to adjust a burner. Our first move will be to check the gas pressure at the

TABLE 1. SELECTION OF IRON PIPE SIZES FOR SKELGAS*

Gas Load In Btu's	40,000	60,000	80,000	100,000	150,000	200,000
Gas Supply Line, Length in feet						
10'	½"	½"	½"	½"	½"	¾"
20'	½"	½"	½"	½"	¾"	¾"
30'	½"	½"	½"	½"	¾"	¾"
40'	½"	½"	½"	¾"	¾"	1"
50'	½"	½"	½"	¾"	¾"	1"
75'	½"	½"	¾"	¾"	1"	1"
100'	½"	½"	¾"	¾"	1"	1"
150'	½"	¾"	¾"	¾"	1"	1¼"
200'	½"	¾"	¾"	1"	1"	1¼"

* Never use pipe smaller than ½".

TABLE 2. SELECTION OF SEMI-RIGID TUBING FOR SKELGAS*

Gas Load In Btu's		20,000	40,000	60,000	80,000	100,000	150,000	200,000
Gas Supply Line, Length in feet								
10'	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	3/4"
20'	1/2"	1/2"	5/8"	5/8"	5/8"	3/4"	3/4"	3/4"
30'	1/2"	5/8"	5/8"	5/8"	5/8"	3/4"	3/4"	7/8"
40'	1/2"	5/8"	5/8"	5/8"	5/8"	3/4"	7/8"	7/8"
50'	1/2"	5/8"	5/8"	5/8"	3/4"	3/4"	7/8"	7/8"
75'	1/2"	5/8"	3/4"	3/4"	3/4"	3/4"	7/8"	1"
100'	1/2"	5/8"	3/4"	3/4"	3/4"	7/8"	1"	1"
150'	5/8"	3/4"	3/4"	7/8"	7/8"	1"		

* Never use tubing smaller than 1/2" O.D.

appliance. If it is a new installation it will be necessary to purge the line of air. This may be done by closing the air shutter on one burner and, opening the valve to that burner, hold a lighted match near the ports. As soon as a flame will stay at the ports you can start opening the air shutter. When the flame becomes stable or shows no change you can consider the line as purged. The usual house line will have purged in less time than I have taken to tell about it.

We find that most appliances come through with the proper sizes of orifice, but if in doubt they can be checked by removing the burner and with a set of wire gauge drills the orifice can be measured.

Servel orifices are an exception to this, but you will find them all marked and by checking with the Servel manual the rating may be determined. Do not attempt to measure or increase the orifice size of a Servel spud. Replace it with a new one of the proper size.

Range Top Burner Adjustment

A. Open valve to burner which you are about to adjust. If it is of the 'hi-lo' type, make sure that it is in the full-on position.

B. Adjust air shutter so that the flame will be well defined with no yellow tips. If the burner has upper and lower air shutters, close the top shutter and make the adjustment with the lower shutter.

C. Check adjustment with a cooking vessel of at least 7" diameter. Carefully note each port flame, especially the center ones, and if there is any tendency to float, try opening the air shutter a little more. Do not make the flame so sharp that it will lift or blow away from the ports when the cooking vessel is removed.

D. Adjust gas input for simmer setting by whatever method the valve offers.

E. Yellow flame and orange flame. The yellow flame is caused by a shortage of air, but there is a colored flame which I call an orange flame and it is caused by dust or certain foreign material in the air. You can



C. C. DUDLEY

expect the orange flame in a dusty atmosphere or during certain baking or roasting operations. The orange flame has no effect on burner operation and will not form soot even if impingement of the flame occurs.

Flash Tube Top Burner Ignition

A. Most flash tube pilot flames are of the yellow flame type, but occasionally you may find a blue flame pilot.

B. The yellow flame pilot is adjusted for height only and it should be just high enough so the top of the flame is in the center of the flash tubes.

C. The blue flame pilot must be adjusted as to height, and also the primary air shutter adjusted to give a soft, blue flame.

No doubt some of you have had trouble with flash tube ignition and it might be well to take time to study this operation. Perhaps the simplest way of describing the usual type of flash tube lighter and its operation is to visualize what happens when a range top burner is placed in operation. As the gas valve is opened, gas flows through an orifice to the main burner and in so doing entrains or injects a certain amount of primary air.

When this air-gas mixture reaches the burner head, a very small portion of it is released through a small opening called the lighter port. This port is located below the main burner ports and is usually supplied with gas as soon as the other ports. The stream of air-gas mixture leaving the lighter port is directed through an air gap, enters the flash tube, and emerges at the far end of the tube in the immediate vicinity of the pilot flame.

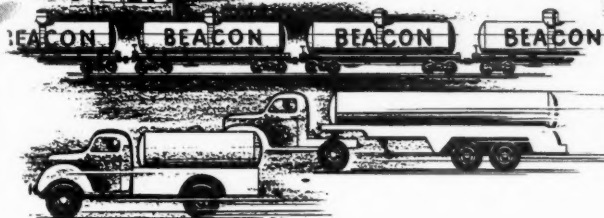
Under proper circumstances, ignition of the air-gas mixture occurs and the flame immediately travels back through the tube to the lighter port, lighting the air-gas mixture issuing therefrom. Ignition of gas issuing from the main ports then takes place, either directly from the lighter port flame or by the instantaneous flash created by the interruption of the backward travel of flame, or by means of carry-over ports which ignite from the lighter port flame and extend up to the main burner ports. Gas at the lighter port continues to burn as long as the burner is operated.

The lighter port may be visualized as the orifice of an ordinary laboratory Bunsen burner which has been turned on its side. The

THE ACCOMPANYING PAPER was presented at the LP-Gas Appliances Short Course, University of Tulsa, in June.

Mr. Dudley is associated with the Skelgas Division of the Skelly Oil Co. and has given special study to the adjustment and operation of gas burners, as he so clearly demonstrates in his text.—Editor.

**LOOK
TO BEACON...**



**FOR FAST, DEPENDABLE SERVICE
ON BUTANE — PROPANE
Immediate Service at Market Prices ...
THE YEAR 'ROUND**

Backed by ability and experience in all phases of procurement and marketing of the LP-Gas industry, Beacon offers you the finest available in product, equipment and consistent year 'round service at market prices.

**100# I.C.C. PROPANE CYLINDERS
DOMESTIC SYSTEMS • STORAGE TANKS
COMPLETE BULK PLANTS
TRUCK TANKS • TRANSPORTS
MISCELLANEOUS LP-GAS EQUIPMENT
BUTANE • PROPANE
Natural Gasoline — Refined Products**

BEACON

PETROLEUM COMPANY
P. O. BOX 2618 • PHONE 5-5553 • TULSA, OKLA.

air-gas mixture issuing from the lighter port and passing through the air gap to the flash tube entrains or injects still more air so that under properly controlled circumstances a flash-back mixture is formed. On leaving the outer end of the flash tube, this mixture is ignited by the pilot flame and a typical flash-back occurs. Ordinarily we try to prevent flash-back, but in the flash tube lighter the reverse is desired, as flash-back must be obtained.

Flash Tube Troubles

A. Flash tubes should be on a slight slope downward from lighter port to pilot flame. Remember that our fuel is heavy. A flash tube on the level might be satisfactory but usually we set them at a slight slope.

B. Keep pilot flame as small as will give satisfactory lighting. A large pilot flame may heat the top of the range excessively and cause the enamel to check; also, it costs to keep pilots burning.

C. If the flash flame continues to burn at pilot end of flash tube, it is a fair indication that the air-gas mixture on the burner is too rich or that the flash tube is too close to the burner. The mixture in the flash tube is too rich to flash back.

D. If you get a "putt-putt" at the flash tube or the lighter port will not continue to burn while the main burner is in operation, it is a fair indication that the flash tube is too close to the lighter port and the lighter flame is being snuffed out. Usually this is corrected by notching the flash tube on the bottom side or removing a little from the end.

E. If you have a burner on which the flash flame will ignite the lighter port and yet the main ports will not ignite from the lighter port, check

the ladder ports or saw cut, or what ever means the burner has for carrying the flame to the main ports. The ports may be blocked or it is possible that a port was not drilled.

Range Oven and Broiler

A. The input rating of oven and broiler burners is shown on the name plate of the appliance. Proper input to the burner is very important.

B. Ovens are to be used while hot; therefore, your final adjustment should be made on a hot oven.

C. You can expect to get a foul odor from a cold oven, also water condensing on the lining and around the door. This will clear up as soon as the oven warms up and circulation gets started. Remember that water vapor is formed when combustion takes place and the cool oven cools the products of combustion and the water vapor condenses and collects until the oven warms up.

D. Adjust primary air so that the flame will be all blue and rather sharp. If the appliance has a separate broiler, the flame should be a little on the soft side for good broiling.

E. Pilot flame should be about $\frac{5}{8}$ " long and located below and to one side of the main ports. If the pilot flame impinges too much with main flame, it will be smothered and burn high, possibly depositing soot on the oven bottom.

Frequently we get a report that the thermostat is defective and that the pilot flame gets larger when the main burner is burning at full rate and that the pilot flame reduces in size when the thermostat reduces the gas to the main burner. This is because the pilot flame is located in the path of the main burner flame and the pilot flame must stretch out to get the air needed to burn the gas. If the range is operated in this condition very long the end of the pilot tube

will be burned off by the main burner flame.

F. When the oven has heated so that the thermostat will reduce the flow of gas to the main burner, adjust the bead flame or thermostat bypass so that there will be a small flame on each port. If the bead flame is too large the minimum oven temperature will be too high for satisfactory baking. The oven temperature will also climb.

G. The thermostat should be checked for temperature setting, using a good quality oven thermometer. If the temperature is more than 10° off, the thermostat should be re-set.

H. Very few ovens are connected to a flue, but when you do find one, check the draft. An excessive draft or a back draft will seriously effect the operation of an oven.

I. Always check the oven vent for steel wool and gadgets, which the customer may have installed to save gas or to absorb grease vapors and odors. If such ideas were good the appliance manufacturer would have built them into the appliance.

Water Heater Main Burner

A. All water heaters should be properly vented.

B. The correct input rate is very important to good performance.

C. Do not use the throttling adjustment found in some thermostats and valves, to adjust the input rate to the main burner. Use the correct orifice and gas flow pressure to get the proper input.

D. Adjust the primary air shutter so that the flame will be all blue, but a little soft; no yellow tips. I mention soft flame because it seems that many water heater flames want to flash-back into the mixers when the thermostat shuts off the gas supply. The flash-back is more severe and

Properties of LP-Gas to Consider to Properly Adjust Burners

Specific gravity of gas vapors

Inflammability limits

Rate of flame propagation

Heating value

Air requirements for complete combustion

frequent with a real sharp flame. The real trouble with a flashback is that it may extinguish the pilot flame and the noise is annoying to the user.

E. Check the flue for draft conditions; an excessive draft or especially a back draft is bad. The back draft diverter furnished with the appliance should be used.

F. Check flame condition with fire box door closed if possible.

G. You can expect to find water in the bottom of the combustion chamber, or even dripping from the heater, the first time the heater is placed in operation or whenever the temperature of the water in the tank approaches room temperature. Remember that water vapor is formed by the burning of the gas and as the products of combustion come in contact with the flues they give up their heat, the water vapor condenses and may drop down into the combustion chamber.

Water Heater Pilots

A. Our firm so far, does not recognize safety controls unless they are of the type that uses a thermocouple to generate the energy necessary to

hold the safety cut-off valve in the open position and my remarks will concern such pilots.

B. The pilot flame must be all blue and rather sharp, burning on about $\frac{3}{4}$ " of the hot junction of the thermocouple.

C. Some pilot burners have means of adjusting the primary air while others do not; also, some manufacturers provide means of throttling the amount of gas going to the pilot burner. If the pilot is only a little oversize, the throttling adjustment can be used, but if the flame is very much oversize I would suggest that the orifice, or the entire pilot burner, be changed.

D. Pilot flame should be as small as will give satisfactory operation, approximately 500 to 700 Btu per hour. Too large a pilot flame will cause the temperature of the water to climb and perhaps develop steam.

E. The location of pilot flame is usually fixed by attaching the burner bracket to some part of the main burner, but check it, a screw may have worked loose or it just isn't where it should be.

A good understanding of combustion and some good reasoning power will take care of most any problem that comes up. If you run up against some unusual problem, first determine what causes the trouble and the solution should not be so difficult.

I believe that you will agree with me that burner adjustments are quite simple, yet they should be carefully made. With most appliances it is only necessary to provide the proper location of the appliance, correct gas input and the correct amount of primary air to the burner.

Advertising and Research Program Developing

Stuart M. Crocker, president, Columbia Gas & Electric Corp., New York, has been appointed vice chairman of the Committee on Promotion, Advertising and Research of the American Gas Assn., it is announced by Robert W. Hendee, president of AGA and president, Colorado Interstate Gas Co., Colorado Springs. Robert A. Hornby, vice president, Pacific Lighting Corp., San Francisco, was recently appointed chairman of the PAR committee for a second term.

The PAR committee is one of the most important committees within the structure of the gas industry's trade association. It has the responsibility of evaluating the special needs of the industry in the fields of promotion, advertising and research and of determining the amounts of money to be raised through industry subscription for these activities each year.

NGAA Regional Meeting at Amarillo Dec. 10

Plant operation and maintenance problems are due for thorough discussion at the Panhandle-Plains regional meeting of the Natural Gasoline Assn. of America scheduled for Friday, Dec. 10, in the Herring hotel, Amarillo, Texas.

Announcement to this effect has been made by the program committee headed by Ervin F. Glasgow, Phillips Petroleum Co., Phillips, Texas.

The one-day meeting will also feature addresses on industry trends by NGAA President C. R. Williams, the Chicago Corp., Corpus Christi; Colonel Ernest O. Thompson, chairman, Texas Railroad Commission, Austin; and L. R. Hagy, Hagy, Harrington & Marsh, Mayor of Amarillo.

WALK



SWIM



RIDE



FLY



But don't miss

W E L B I L T

AT THE MARKET

Space 520

**AMERICAN
FURNITURE
MART**

*a great team
for sales and profits!*



DECEMBER — 1948

Now It's the Night School!

TWENTY-SIX men and one woman representing six producing and wholesale marketers of LP-Gas and pertinent equipment, with headquarters in Tulsa, Okla., enrolled for a special night training course offered by the National L-P Gas Institute of that city, Oct. 28.

"This night school is just another service the Institute is able and glad to render to the industry," said F. E. Farley, president. "It also indicates the increasing interest on the part of manufacturers and wholesalers in the distribution problems of the business, particularly as these relate to transportation, safe and proper handling of the product, and safety rules and regulations governing it."

The regular staff of instructors, headed by Earl A. Clifford, chief instructor, are conducting these night classes. The course will provide a min-

imum of 36 hours—3 hours per evening, 2 evenings a week—of lectures and forum discussion and demonstration of pertinent equipment.

Those enrolled are: Coralie Savage, Athens Petroleum Corp.; Lewis W. Dillon, Howard I. Fidler, Richard Larson, Walter Nackerud, C. R. Noland, Anco Manufacturing & Supply Co.; Will K. Holmes, A. J. Hogan, Donald E. Miller, Ralph R. Morris, Charles H. Swanson, Guy C. Miller, Anchor Petroleum Co.; Wayne Richison, John J. Yarger, Sinclair Prairie Oil Co.; R. J. Pfeifer, Stanolind Oil & Gas Co.; Don Baird, Clarence T. Birch, Douglas A. Collins, J. A. Furr, Raymond E. Hoagland Jr., Don Maas, Ralph W. Howser, George E. Skye, Joe R. Thornton, Floyd A. Vowell, Max E. Foster, H. L. Willey, Warren Petroleum Corp.



A newly organized night class at the National L-P Gas Institute in Tulsa, Okla.

Checking Equipment to Make A Safer Industry

WE*, of Underwriters' Laboratories, Inc., sometimes feel that what we are trying to accomplish in our investigation of equipment submitted to us for test is misunderstood. Some feel that the getting of Underwriters' Listing of a product is a nuisance without rhyme or reason to the requirements to which the product must comply. And so, I would like to discuss with you some of those requirements and just what the thinking is behind them.

D. L. BRETING

The guide for our investigations of LP-Gas equipment is the National Board of Fire Underwriters' Pamphlet No. 58 covering the "Design, Installation, and Construction of Containers and Pertinent Equipment for the Storage and Handling of Liquefied Petroleum Gases." These Requirements do not originate with the National Board of Fire Underwriters, but are

By D. L. BRETING

Assistant Secretary, Underwriters' Laboratories, Inc., Chicago

drawn up by the Committee on Gases of the National Fire Protection Association.

The members of this committee are authorities on the subject and include prominent men in the LP-Gas industry who work with LP-Gas for their livelihood. Seven of the 23 members of the Committee on Gases are men from the LP-Gas industry. So you see that the rules are not laid down by persons not having an interest in the subject but by a committee many of whose members are from your own industry.

Underwriters' first listing of this type of equipment was made back in 1923. However, the volume of this work was relatively small until after the close of the last war when we began to list the individual accessories for LP-Gas systems as well as to investigate the systems themselves. Prior to this time when a system was investigated, it was necessary to examine and test each fitting on it. Now it is simply a matter of checking to see that the fittings used are listed and of the proper size for the

* Paper read at the Sept. 20-22 convention, National Butane-Propane Assn., Chicago.

installation while directing most of our attention to the arrangement of the fittings.

The separate listing of fittings is intended to give you a readily available source for determining which fittings have been investigated and found acceptable by us. It also serves to shorten our work in listing systems and thus decrease the cost of our engineering investigation to you.

In the installation of ICC cylinder systems, an item often overlooked is the minimum horizontal distance of 5 ft that the discharge of safety reliefs shall be located away from any building opening which is below the level of such discharge. When one considers that propane gas is approximately $1\frac{1}{2}$ times as heavy as air, the necessity of this requirement is apparent. The further requirement that valves and regulating equipment shall be protected against the weather is also undebatable.

Fill Carefully for Safety

In the servicing of the cylinders, one cannot caution often enough against the seriousness of overfilling; as the temperature rises, overfilled cylinders may go hydrostatic, rupturing the cylinder and turning loose the highly volatile and combustible liquid to seek a source of ignition. Because of the coefficient of expansion of liquid fuels, a cylinder of propane which is overfilled 10% at 60°F is nearly full at 85°F.

When cylinders have been filled, checks should also be made on each cylinder for leakage around the

cylinder valve threads, past the valve seat, or at the relief valve. This job can easily be performed with a small brush and a small amount of soapy water.

One should not overlook the possibility of making safety missionaries of his service men. Instruct them when picking up and delivering cylinders to look for items in the installations which do not set upon firm foundations or otherwise firmly secured, sharp bends in the copper tubing, inadequate protection of the system fittings and to watch for cylinders which should be retested under ICC requirements. Remember that every fire, every accident in the field, regardless of its origin, reflects on the entire LP-Gas industry.

Since many of the ICC cylinder system fittings are interchangeable with fittings for ASME tank systems, I have not attempted to discuss their investigation separately.

In many respects, the relief valve can be considered as one of the most important fittings on an LP-Gas tank installation. It is seldom called upon to function but when the tank pressure rises above the working pressure of the tank, the necessity of the relief valve operating to relieve the pressure is very important.

Prior to the publication of the January, 1947, Pamphlet, the size of safety relief valve for any particular tank was based upon the free discharge area of the valve. The new Pamphlet, however, requires that the valves be marked with their actual discharge rate.

In our early investigation of re-

Relief valves to determine their capacities, we found several which had flow efficiencies of as low as 10%. That is, the ratio of their actual flow capacity to the theoretical flow based on their free discharge area, was about 1/10. Some present day designs have efficiencies running as high as 95%. In addition to the flow test, other tests are run on relief valves to determine their tendency to stick in the closed position, the suitability of the materials used, and the accuracy of their start-to-discharge pressure settings.

Relief valves have been placed under our "Label Service" form of follow-up service. Under this type of service, visits are made to the manufacturer's plant to check his current production as often as several times a week during the early stages of listing. The labels attached to the valves indicate the container type on which they are to be installed, the code construction under which the container was made, the start-to-discharge pressure setting of the relief valve, and its rate of discharge in cubic feet per minute of LP-Gas. To prevent tampering, the settings of listed relief valves are sealed.

A word of caution: Never attempt to change the setting of a relief valve; rather, replace it with a new valve and return the faulty valve to the manufacturer for re-setting. If the adjusting screw of a valve is threaded down too far, the valve may be unable to open to its full open position and thus cannot discharge its rated capacity.

On aboveground tanks, the dis-

charge from the safety relief valve shall be vented away from the container upward and unobstructed to prevent impingement of escaping gas upon the container; loose fitting rain caps shall be used. On containers of more than 2000-gal water capacity, the discharge from the safety relief device shall be piped upward to a point at least 10 ft above the tank. This is to prevent the gas discharged from the valve from forming a gas-air mixture which will be combustible at or near the ground level which would constitute an explosion or fire hazard.

Valve Requirements Important

The requirements covering filler and vapor-return valves are also numerous and important to the safe filling of ASME tank-type systems.

Pamphlet No. 58 requires that the filling connection shall be made up of one of the following combinations: Combination back-pressure check valve and excess-flow valves; one double or two single back-pressure check valves; or a positive shutoff valve in conjunction with either an internal back-pressure valve or an internal excess-flow valve. All of these combinations permit flow in only one direction, flow into the tank during the filling operation.

They are also designed to permit replacement or repair of the outer check valve or shutoff valve without undue loss of the tank contents. This is accomplished in the combination incorporating an excess-flow valve, by depressing the back-pressure check valve or opening the

shutoff valves sufficiently to allow the excess-flow valve to snap shut, after which the shutoff valve or back-pressure valve can be removed for servicing.

In the combination where a back-pressure check valve serves as the inner check, the shutoff valve or outer check can be removed for servicing as the inner back-pressure check will serve as a shutoff valve. The necessity of proving a suitable means of servicing the outer back-pressure check or shutoff valve without waiting for the system tank to become empty is questionable.

Filling Pump Load Reduced

Vapor-return valves provide a return path for the vapor displaced from the tank being filled back to the filling tank. This reduces the load on the filling pump by decreasing the head against which the pump must operate. Vapor-return valves are made up with the inner check and excess-flow valve and the outer check a back-pressure check valve. This combination also permits the servicing of the back-pressure check valve while the system is under pressure.

In the investigation of filler and vapor-return valves, Underwriters' Laboratories, Inc., runs many tests to determine the suitability of these valves for their intended service. These tests include the following:

(1) Leakage tests are run at twice the working pressure of the valve seat and for leakage between the upper and lower bodies of two-piece valves. The working pressure of the valves is considered as 250 psi and so the test

pressure is 500 psi, a factor of safety of 2.

(2) Hydrostatic pressure tests are run at five times the working pressure of the valve (1250) psi to check the internal strength of the assembly.

(3) Physical-chemical tests are conducted to determine the suitability of the materials used for particular service conditions. These include oxygen bomb tests and extraction tests on rubber materials, steam stability test on all zinc-base die castings and, where necessary, season cracking tests on machined rod brass parts.

(4) Break-off tests are conducted to determine that when an undue stress is applied to the threaded connections of the valve (as would occur if the service truck began rolling with the fill and vapor hoses still connected) the valves will break above the outer back-pressure check, leaving the remainder of the valve intact and operative.

(5) Flow tests are run on excess-flow valves to determine the capacity flow at which the checks will operate and to determine the minimum operating pressure of the valve with the discharge unrestricted. In order to have adequate protection on butane systems, we have required that the minimum operating pressure be not over 10 psi. We frequently hear of cases where the inside working parts of installed vapor-return valves are completely removed or otherwise rendered inoperative because the operator feels that the excess-flow valves operate at too low a flow capacity. If we were to raise the minimum pressure or flow capacity at which the excess-flow valve could operate, we feel that the safety features of the valve would be defeated.

Service line shutoff valves and cylinder valves are subjected to the hydrostatic pressure test and leak-

age tests described above. Physical tests are also conducted of the materials used. In addition, they must withstand 6000 operations without undue wear of the seat or without leakage past the valve stem. The service line shutoff valves for ASME tank installations of less than 1200-gal capacity, are designed with controlling orifices between the container and the outlet of the valve withdrawal systems and $\frac{1}{8}$ in. in diameter for liquid withdrawal systems. Cylinder valves for ICC cylinder systems which incorporate safety relief devices must be accepted by the Bureau of Explosives before being listed by Underwriters' Laboratories, Inc.

Should Test Pressure Regulators

Pressure regulators are given operation tests to determine their operating capacities and are also checked to see that the relief valve on the low-pressure side of the regulator has the required capacity and will relieve at the proper pressure. According to Pamphlet 58 the relief valve shall be set to relieve at not less than two times and not more than three times the discharge pressure. Since most regulators are set for an 11-in. water column, down-stream pressure, the relief valve settings are between 22 and 23 in. of water column. The purpose of the relief device on a pressure regulator is to prevent excessive pressures at the consuming appliances should a leak occur in the diaphragm or at the valve seat.

I have not attempted to discuss

all of the safety requirements given in Pamphlet No. 58 or our interpretation of those requirements in the examination and test of accessories and systems submitted to us. Rather, I have attempted to discuss with you the logical safety-minded thinking behind some of the LP-Gas requirements.

Safety Suggestions for Industry

In closing, I would like to mention some of the things which we feel that you, the dealer, can do to make the LP-Gas industry safer:

(1) Instruct your men in the safe handling of LP-Gases.

(2) Make your service men safety-minded, so that in their service calls they will observe and call to your attention any unsafe conditions. These would include safety relief discharge vents closer than 5 ft horizontally from any building opening below it, cylinders which are not set upon firm foundations or otherwise firmly secured, sharp bends in the copper tubing, inadequate protection of the cylinder fittings, and tall grass growing close to the storage cylinder or tank which may possibly become ignited.

(3) Warn your men not to tamper with the settings of relief valves or remove the excess-flow checks from vapor-return valves.

(4) Be sure that your delivery men who fill the ASME tank type systems, block the wheels of the truck before connecting up the fill and vapor-return hoses.

(5) Purchase only accessories which have been listed by Underwriters' Laboratories, Inc., for conformity to the requirements of NBFU Pamphlet No. 58.



DAVID CROFUT



RUTH PERSONEUS



WM. D. TOMPKINS



WILLIAM KEMP



C. H. SCHUMAN

"As Long as There's Been an Industry" The 25-Year Club

FIVE LP-Gas pioneers are the charter members of Pyrofax gas sales Quarter Century Club. The Pyrofax gas division of the Carbide and Carbon Chemicals Corp., New York City, recently honored these five individuals who have celebrated their 25th year in the business with an article in Pyrofacts, the magazine "for everyone who sells 'Pyrofax' gas service."

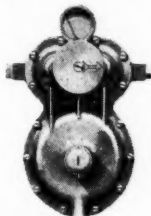
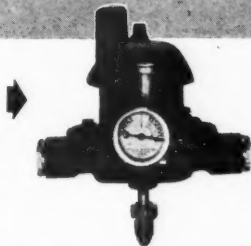
Those cited are W. M. "Bill" Tompkins, of W. M. Tompkins Inc., East Williston, L. I.; William Kemp, central division field manager for Pyrofax; Charles Schuman, of C. H. Schuman Inc., Briarcliff Manor; and David Crofut and Ruth Personeus, who have been with Mr. Schuman since he started business.

The Pyrofax gas division was organized in 1921, and, after two years devoted in the main to research and field tests, active selling began and the Pyrofax gas distributor organization had its inception. Bill Tompkins was the first Pyrofax gas distributor. During the same period Bill Kemp sold the assets of his Kemp Gas Co. to Carbide, and Charles Schuman, a dealer for Kemp Gas, also entered the Pyrofax gas business. Miss Ruth Personeus capably manages Mr. Schuman's office, while David Crofut is an installation and service expert who has also been with Mr. Schuman for 25 years.

These charter members will be given special presentations at distributor meetings during the winter.

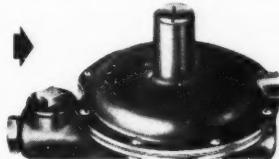
RELIANCE gives you the REGULATOR designed for your needs !

"MR" is a single-stage multiple regulator which reduces high pressures to more efficient use by a secondary regulator. It will draw automatically on both cylinders when peak load is required, reverting to the service cylinder alone as the load decreases. This regulator is especially recommended for pilot light equipment and continuous burner service.



"DBP" is a two-stage regulator designed for duplex service. In the first regulation stage varying service cylinder pressures are reduced to 15 pounds; in the second stage this 15 pounds is reduced to a uniform 11 inches water column pressure at the outlet. When the service cylinder is empty, the reserve cylinder automatically cuts in, the indicator hand moving from service to reserve to indicate the cylinder in operation.

"BKR" is designed as a primary or secondary unit equipped with internal relief valve which can be set to relieve at pressures from 25 to 35 inches water column. Normal outlet pressure of 11" water column is maintained. The valve mechanism is easily accessible through the inspection plug.



"BP" is designed for smaller capacities than the "BKR." It is a convenient and economical regulator for the low-volume consumer, and provides precision control of outlet pressures.

Write for Bulletin 40.

AMERICAN
METER COMPANY

RELIANCE
REGULATORS

RELIANCE REGULATOR CORPORATION
1000 MERIDIAN AVENUE, ALHAMBRA, CALIFORNIA

ASSOCIATIONS

LPGA

As a first move toward preparing for the 1949 annual convention of the Liquefied Petroleum Gas Assn., President

Kenneth H. Koach has appointed J. Richard Verkamp, of the Verkamp Corp., Cincinnati, chairman of the convention committee.



J. R. VERKAMP

Next year's convention and trade show will be held at the Palmer House, Chicago, May 9-11.

At the meeting of the board of directors in Atlantic City in October, board vacancies were filled as follows:

From Mississippi: S. A. Scott, Scott Butane Gas Co., Inc., Itta Bena.

From Wyoming: A. W. Jensen, Ranchers Gas & Supply Co., Cheyenne.

Temporary Sectional chairmen have been appointed by President Koach as follows:

International Section: Geo. M. Parker, Esso Standard Oil Co., New York City.

Utilities Section: Ralph L. Sieben, Metrogas, Inc., Chicago.

NGAA

The Natural Gasoline Assn. of America has decided to return to the

Texas hotel, Fort Worth, for the 1949 annual convention, the dates being April 20-21-22. Room reservations should be made as soon as possible.

The four hotels cooperating with the convention are: Texas, Blackstone, Worth and Westbrook.

NBPA

Several association committee appointments have been made by John L. Locke, elected to the presidency of the National Butane-Propane Assn. at its annual convention in September. The committees follow:

Auditing—John M. Robinson, chairman, with three members.

Convention—Joseph Herrmann, chairman, with seven members.

Membership—Stan Beske, chairman, with 13 members.

Nominations—R. N. Short, chairman, with six members.

Safe Practices—Earl C. St. Cyr, chairman, with 14 members.



STAN BESKE



EARL ST. CYR

BUTANE-PROPANE News

The membership, convention and safe practices committees will meet at the time of the quarterly board meetings—in December, March, July and September. Naturally, the nominations and auditing committees meet only at the time of the annual convention.

The board of directors will meet Dec. 13-14 at the Jefferson hotel, St. Louis, where one day will be devoted to discussions of the problems of each committee.

The March, 1949, meeting of the board will be held in Miami, Fla. Plans are now being made to hold the July meeting in a resort area in Minnesota but exact dates and location have not yet been decided upon.



R. Y. MILLS



JAS. L. BRADLEY

Colorado

Following the Sept. 26-28 annual convention and trade show of the Colorado Liquefied Petroleum Gas Assn. held in Denver, programs formulated there are being enthusiastically carried out by committee members.

The second week in February, 1949, will see the Rocky Mountain Empire LP-Gas service school under way. According to Jimmy Thompson, a mem-

ber of the school committee and new treasurer of the state group, the four days of hard work at the service school will be well worth the effort because of the informative lectures on industry practices. This western school will probably have many of the instructors that were at the University of Pittsburgh short course held in September.

School Open to All

It is important to note that the Colorado school is not limited to men from Colorado. The state association and the Liquefied Petroleum Gas Assn., which jointly sponsor the school, invite dealers and their employees from the Rocky Mountain states and elsewhere to attend. The exact dates of the school will be announced in the near future by Jas. L. Bradley, executive vice president.

Association committees and directors urge Colorado dealers to attend their district meetings and participate in the discussions on credit, lost bottles, legislation, insurance and other important industry topics. The insurance committee plans to send a member to each district meeting. The credit and lost bottle programs, planned at the annual convention, will be put into operation after the first directors meeting.

An advertising committee was created at the state convention and members will be appointed shortly by R. Y. Mills, president of the association.

The association is sponsoring an advertising program in "Western Farm Life" which will start with an editorial in the magazine followed by 12 successive ads. This schedule is in addition to the "Profit Package" which has been in operation in Colorado since the spring convention.

Millions learn the magic of the MAGIC-MIRROR DOOR



Costume by
Tailored Woman

Through consistent advertising in
Good Housekeeping and Better Homes and Gardens, millions of
prospective range buyers are learning that the new SGE has everything,
PLUS the amazing Magic-Mirror Door.



This SGE PLUS

is getting talked about. And you can get the benefit by putting this Magic-Mirror feature into action in your window or on your store floor. A flasher in the oven demonstrates the magic. On, it's a see-oven window. Off, it's a hide-oven mirror.

CHECK THESE FEATURES, TOO

1. Construction to CP standards.
2. Complete oven time and temperature control.
3. High, smokeless broiler.
4. Condiment set.
5. Smart, exclusively designed hardware and accessories.
6. One-piece turret top.
7. Dual-ring top burners.
8. Varied burner layouts.
9. Models for bottled gas.

SGE

ORIOLE·ACORN·VULCAN

STANDARD GAS EQUIPMENT CORPORATION

BAYARD AND HAMBURG STREETS • BALTIMORE 30, MD.



Kansas

At a meeting of the board of directors, which followed the annual membership meeting of the Kansas



F. N. HAVENS

LP-Gas Assn. on Oct. 22. F. N. (Niele) Havens, Union LP-Gas Systems, Independence, Kan., was elected president. Other officers elected by the board are: Glen Humburg, LaCrosse, vice president, and W. B. Hettic, Liberal, secretary. J. V. Pratt is the retir-

ing president.

The following new directors were elected by the membership at the afternoon business meeting: A. C. Ferrell, Ferrell Butane Gas Service, Atchison, director at large, succeeding Carl Deatz, Hutchinson, Kansas; George McClellan, Propane Gas Service, Salina, succeeds Ernest Wissing, Salina, as director from District 3, central northeast, and F. N. Havens was reelected as director from District 2, southeast. Following are the officers and directors for the next year and the districts they represent:

Dist. 1, N.E., H. R. Seacat, Emporia.

Dist. 2, S.E., F. N. Havens, Independence.

Dist. 3, Cen. N.E., G. M. McClellan, Salina.

Dist. 4, Cen. S.E., Eli Worden, Winfield.

Dist. 5, Cen. N.W., Glen Humburg, LaCrosse.

Dist. 6, Cen. S.W., Si Darling, Pratt.

Dist. 7, N.W., Jim Pratt, Colby.



J. V. PRATT



GLEN HUMBURG

Dist. 8, S.W., W. B. Hettic, Liberal. Director at Large, A. C. Ferrell, Atchison.

R. H. Mahnke is executive vice president.

Dr. H. C. Mahan, professor of economics, Wichita University, addressed the meeting at the luncheon session, speaking on "The Business Outlook in the American Rural Markets." Presenting figures and facts on current buying power, Dr. Mahan spoke optimistically on the soundness of our present economy. Referring particularly to the midwestern states, he pointed out that the economic position of the farmer has never been better and predicted that 1949, from present indications, is very likely to be equally as good as 1948.

Sam Boothe, Homegas, Wichita, spoke to the group on the present rural electrification program in Kansas and gave details of a pamphlet prepared by his company, which presents the advantages of LP-Gas for cooking, water heating, refrigeration and house heating. The booklet, entitled, "A Guide to Better Living in the Modern Home," will be made available to LP-Gas dealers throughout the state.

A. C. Ambrosia, Wichita, and

George Kaufman, Salina, discussed several matters pertaining to LP-Gas insurance coverage. Both commended the association for the work accomplished in the promotion of safety among its members.

Other matters which were discussed by the group included a weights and measures proposal for the Kansas LP-Gas industry, another service school to be sponsored by the association, publicity for farm papers and future conventions and trade exhibits.

Through the courtesy of several manufacturers, distributors and suppliers of LP-Gas, equipment and appliances, a free dutch lunch was served for the guests on the evening following the meeting.

Nebraska

An enthusiastic group of dealers met at the annual convention and appliance show of the Nebraska Liquefied Petroleum Gas Assn. Oct. 7-8 at the Rome hotel in Omaha to hear many interesting and enlightening papers, according to Fremont Meyers, executive secretary.

Officers of the association were elected for a two-year term in 1947. They are: G. E. Switzer, president; Vic Anderson, vice president; D. R. Lamme, vice president; E. L. Hoover, treasurer. W. R. Hughes was elected to the board of directors and takes over the secretaryship of the group.

Speakers and their subjects follow:



Here are the newly elected directors of the Kentucky LP-Gas Assn. (left to right): Roland B. Jones, R. B. Greene, C. G. Keesy, R. N. Short, Miss Frances L. Holliday, Chas. L. Shaffer, R. S. Harvey, J. M. F. Hays, and James A. Lewis.

Photo by Austin Jones of Kerotest Manufacturing Co.



MORE CAPACITY



CAPACITY
PROPANE 105
BUTANE 95

for increasing Volume

A larger, lightweight meter, the Sprague Zephyr was designed especially for LP-Gas installations. Incorporated are all the proven Sprague features of simplified assembly, interchangeable parts and strong aluminum and cast iron cases, that assure long life and low maintenance costs.

SPRAGUE

THE SPRAGUE METER COMPANY
BRIDGEPORT 4, CONN.

GAS MEASURING
AND REGULATING
EQUIPMENT

T. H. Anderson, Skelly Oil Co., Denver, "Problems of LP-Gas."

Robert Blum, Underwriters, Inc., Denver, "Insurance Problems in the Industry."

J. L. Sanders, Spencer Chemical Co., "The Future of Anhydrous Ammonia."

E. C. Iverson, state fire marshal, pledged the full cooperation of his office in uncovering bad practices; in turn, asked the industry to aid his office in uncovering bad practices in the state.

Harris A. Goodwin, Bastian-Bles-sing Co., Chicago, gave a talk entitled, "It Can Happen Here," presented with slides of good and bad installations.

Walter L. Hanau, Fidelity & Casualty Co., Chicago, spoke on "Inspection Will Prevent Accidents if..."

During the convention, the board of directors met with several underwriters to attempt to solve the insurance problems facing industry men. A proposal to include the entire industry in the state will be presented as soon as possible.

New Jersey

More than 150 men of the liquefied petroleum gas industry in the state of New Jersey attended a dinner meeting of the association Oct. 27, and took up matters related to the progress of the industry. The meeting was held at the Far Hills Inn, Somerville, N. J.

The organization discussed in detail the New Jersey state law which goes into effect next Jan. 1,



ED. A. KEIBLE

establishing a sickness and accident fund for all employees now under the unemployment compensation law. Austin Kelly and Fred R. East, representing the National Employee Relations Institute, presented a plan which would give employees added benefits. Action on this plan was withheld until more detailed information could be obtained by all members.

Films dealing with extinguishing propane fires were shown by a representative of the Ansul Chemical Co.

The meeting was presided over by Edward Keible, president, and the speakers were introduced by Al Milchanoski, Guy Richdale and Murray Glass—all members of the board of directors.

Ohio

The fall meeting of the Ohio Liquefied Petroleum Gas Assn. was held at the Deshler-Wallick hotel, Columbus, on Oct. 19, with 76 people registering to hear several interesting papers.

According to L. W. Gehring, secretary-treasurer of the group, the meeting was very well received and attendants listened with interest to the following men:



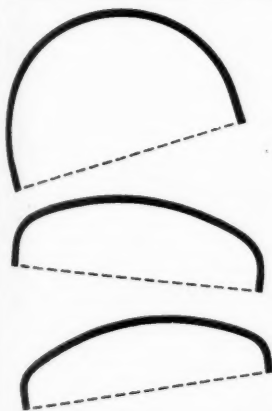
W. G. DUNCAN

J. Richard Verkamp, Verkamp Corp., condensed the activities of the AGA and GAMA convention held recently in Atlantic City.

Current problems affecting the LP-Gas industry were outlined by Arthur C. Kreutzer, secretary of the LPGA. This discussion was followed

LUKENS HEADS

speed your assembly line



Hemispherical heads, elliptical, standard dish and high crown, deep dish heads—Lukens has hundreds of dies for making these and other types. Lukens Heads are uniform in shape and accurate in dimensions. They help increase production from your assembly line and hold down your costs.

Lukens Catalog No. 1 describes 3,868 Heads. For a copy and for prices, write Lukens Steel Company, 422 Lukens Building, Coatesville, Pennsylvania.



"Head Work", a 16mm motion picture in sound and color, on spinning and pressing of Lukens Heads is available without charge. Running time: 27 minutes. Write for a booking date.

FOUR INCHES TO OVER TWENTY FEET IN DIAMETER



L. H. ADAMS



L. W. GEHRING

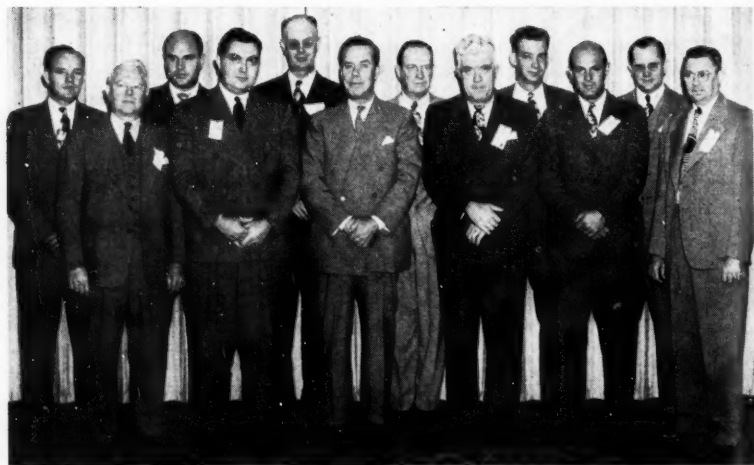
by a presentation of the "Profit Package" advertising plan of Beals Creative Printers.

Of particular interest to Ohio industry men was the explanation of

the new Ohio fire marshal's regulations by E. O. Mattocks, Phillips Petroleum Co., and co-author of the new Ohio law. After the highlights were presented by Mr. Mattocks, he and Gayle Owens, assistant state fire marshal, presided at a question-and-answer session on the regulations and their application.

A recounting of the activities of the LPGA service school at the University of Pittsburgh by George Gray, Verkamp Corp., preceded a talk by Ralph H. Engstrom, the Bastian-Blessing Co., on LP-Gas regulating equipment.

In addition to Mr. Gehring, officers of the group include W. G. Duncan, president, and Lyman H. Adams, vice president.

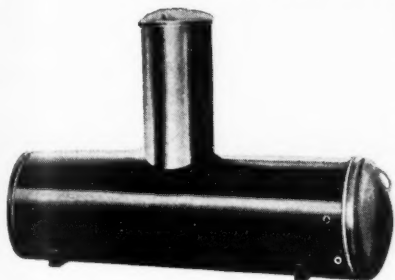


Missouri LP-Gas Assn. officers. 1st row: H. G. Baur; K. H. Dickson; George Ryan; Monte Taylor; Crump Taylor; A. W. Scofield. 2nd row: Paul Sims; J. E. Moore, Jr.; L. D. Beckett; J. A. Felder; C. A. Enos, Jr.; W. A. Schuette.

WE ARE IN PRODUCTION NOW

For Immediate Delivery

WHY DELAY ORDER NOW



Domestic Systems Underground and Aboveground

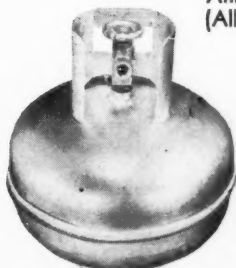
We manufacture everything in the pressure vessel line for the L.P.G. industry.

Ranging from 20# I.C.C. Cylinders to 30,000 Gallon Storage Tanks, including:

Motor Fuel Tanks Truck Tanks
Transport Tanks and Trailers
Storage Tanks Skid Tanks
Above and Underground Domestic Systems
Refinery Equipment Air Tanks
Anhydrous Ammonia Tanks
(All Kinds)

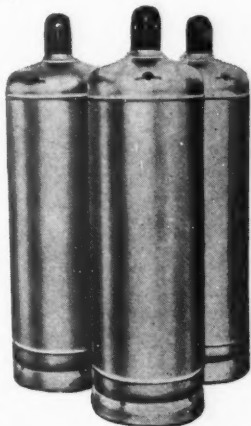


200 # Capacity
Propane Cylinder
200 # W.P., U69
A.S.M.E.
57 Water Gallon
Capacity



20 # I.C.C. Cylinder

Prices quoted on request to
our or your specification.



100 # I.C.C.
Cylinders



Prospect 7-2441

P. O. Box 5146

Dallas, Texas, U. S. A.

LIQUID METERS

Principles, Installation, Operation, Servicing

THIS is a discussion on liquid meters used in the measurement of liquefied petroleum gas. Many hydrocarbon liquids are measured under various conditions of processing and sales, but few present as many hazards to accurate measurement as do the liquefied petroleum gases.

Many misconceptions are in existence concerning the metering of butane and propane. It has been definitely proven, however, if the meter installation is engineered correctly and if careful attention is given to proper operating procedure and equipment maintenance, that butane and propane can be metered within accepted commercial tolerances.

We will endeavor to trace the principles of positive displacement meters and their application to the liquefied petroleum gas field; we will outline the salient points that must be observed in the design of installations, and we will endeavor to acquaint you with the details of the three present methods of testing and calibrating these meters.

May we emphasize that the metering of these fluids is not a mature science. Many of the developments of which we speak represent original work done in the past five or six years. This field is sufficiently new that few, if any, weights and measures regulations have been

J. W. JOHNSTON*

Westcott and Greis, Tulsa, Oklahoma

definitely adopted to govern the measurement of this liquid when the transfer represents a sale.

We believe that it would be well to first state the basic principles of the various types of positive displacement meters that are now in use on this commodity. In general they represent the adoption by this field of the various types of meter equipment that have been used for a number of years in the measurement of gasoline and heavier petroleum products.

Early petroleum meters were piston meters—varying as to the number of cylinders and arrangement. The first piston meters utilized cup leathers to effect a seal between the piston and the cylinder wall, then came the closely fitted piston which depended upon the capillary effect of the liquid between the closely fitted parts to act as a seal. The oscillating piston meter also uses the liquid seal principle. The rotary meters, the more recent development, are also of the liquid seal type.

In fact meters may be classified

* Delivered at LP-Gas Appliance Short Course, University of Tulsa, June 2-5, 1948.

under two headings, the packed seal and liquid seal types. All of these types of meters are currently being used in the measurement of liquefied petroleum gas. These, however, represent only the basic metering units. Without particularly designed accessories, they will not be accurate when used on the product we are discussing today.

Liquefied gases present several particular hazards that are common to all metering systems. First, a material is being handled that is dry and entirely without lubricating qualities. It is for this reason that care must be used in selection and in the periodic servicing of the equipment, for no lubrication is possible on the moving parts of a liquid meter other than that provided by the liquid it is metering.

Low Vapor Pressure Is Hazard

The second hazard is the low vapor pressure of the product. On any positive displacement meter provision must be made to insure solid liquid in the measuring unit at all times. Since gas will occupy space in passing through the measuring unit, it will register as a liquid. This second factor presents the greatest hazard to meter accuracy. Improper installations or equipment that permits vaporization of the product in the system will always result in an inaccurate measurement.

Third, is the low viscosity of the product. Each design can have a fractional amount of liquid leakage. This liquid leakage can increase as the viscosity decreases. It is commonly referred to as "hy-



LIQUID LEAKAGE

draulic slip." In amount it is proportional to the pressure drop across the closely fitted moving parts and its effect on meter accuracy is in proportion to the rate of flow in relation to the size of the meter.

All positive displacement meters have a curve that is characteristic for their particular type. All of these curves have one common characteristic. At extremely low flows they will all over-deliver, or deliver what we call a long gallon. Meters are sized to deliver accurately over that specific portion of their range that comes within the flat section of the curve. Therefore, it is important that the right size meter be used for the job.

In the liquefied petroleum gas business we are fortunate in that demands for meter capacities are limited and a wide range in sizes is not required. Our advice to you, however, in the use of positive displacement meters is to be sure that

a large meter is not used for low flows, for there an inaccurate measurement can result, or that too small a meter is not used at high flows, for there excessive wear due to lack of lubrication will result.

We would like now to outline the most common types of installations and to lay particular stress on the points in any installation that are most important.

First, we will consider the basic problems that apply to this type of metering installation.

1. There must be no restriction in the piping that will cause an excess pressure drop. This is particularly true on the suction side of the pump. It is always good practice to size the suction lines in relation to the discharge lines, stepping them up a minimum of one pipe size over the discharge line.

2. The bypass of a pump should always be piped around the pump and preferably back to storage. Those pumps having built-in bypass valves must be avoided or a second bypass provided that will carry the load. Circulating LP-Gas in a small closed bypass system at the pump heats the liquid and induces vaporization.

3. Do not attempt to operate positive displacement pumps on LP-Gas systems at a high rate of speed in order to increase the flow. The recommendations of the pump manufacturer should be followed religiously. Excess speeds and their resultant heat tend to vaporize the liquid.

4. Extreme care must be used in piping design and installation. The pipe assembly must be carefully built and all undue strain avoided.

The following two methods convey the essential factors of a truck-mounted metering and pumping

system: These installations have been planned to make sure that vapors are not permitted to pass through the meter. Under one type of installation we have a vapor eliminator that is intended to remove the vapor and return it to the storage tank. The second system, by use of a differential regulator, maintains a pressure in the metering system in excess of the vapor pressure of the liquid. We will consider each of these systems individually.

Spring Loading the Problem

When a vapor eliminator is used, it is also necessary that a back pressure valve be provided. The problem in all systems using vapor eliminators is to determine the spring loading on the back pressure valve. To the extent that the delivery is made under normal operation to tanks having vapor pressure somewhere near that of the product in the delivery vehicle, this system is perfectly satisfactory. It is also satisfactory when care is used to be sure that the vapor exchange line is opened to the receiving tank before delivery is started in order that vapor pressures may be balanced. The back pressure valve then provides an artificial restriction on the downstream side of the meter. The vapor eliminator is provided with a float operated valve which opens when vapors collect in the top of the chamber.

With the aid of the artificial restriction, sufficient pressure differential is created to cause the collected vapor to be expelled through the float operated valve and re-

turned to the vapor space in the tank of the delivering vehicle. As the vapor eliminator is purged of vapor, the valve closes and solid liquid delivery is assured through the meter system. These vapor eliminators may take various forms.

It's Close to Foolproof

The second system employs a differential regulator and is perhaps the most foolproof system of all. It insures a pressure in the metering system in excess of the vapor pressure of the liquid at all times. This is done by using a diaphragm valve, spring loaded, on the downstream side of the meter. The top of this diaphragm is connected to a pressure zone on the delivering vehicle, either at the tank outlet point or the vapor space. Two means may be used to provide additional pressure at this valve and insure that the pump must put out a pressure in excess of the vapor pressure of the liquid for the valve to open and liquid to flow. One method is to add a spring to this valve.

The second method uses two diaphragms, the uppermost one connected to the pressure source being proportionately larger than the lower one and insuring always that the pressure on the valve will be in excess of the vapor pressure of the liquid by that proportion. In this manner you are sure of having solid liquids through the metering system and should the delivery vehicle be connected to a low pressure receiving tank, then the meter delivery will still be accurate without pressuring the receiving tank. The liquid would not be able to flash to

vapor until it had passed the differential regulator at a point after it had been successfully metered.

Our next consideration is a bulk plant from which delivery tanks are loaded. The characteristics of the truck installation will apply here as to comparisons between the use of vapor eliminators and differential regulators. One is a simple installation intended merely to provide for the metering of butane to a delivery vehicle. The other is a system that may be installed to meter the incoming products from delivery tank trucks using the same system as is used to meter the output to the truck.

One of the most difficult measurement problems in the liquefied petroleum gas field is the measurement of tank car delivery to bulk storage. This particular operation can introduce many factors which cause an inaccurate reading of the meter. The tank car is loaded to ICC regulations and the purpose of metering is usually to obtain a check against the shipper's manifest and if the meter and tank car manifest do not agree perfectly, there is much room for argument.

The First Was the Simplest

The first method used was the pump system. This is the simplest system to meter but it has certain disadvantages. From the purchaser's point of view the most serious drawback is that the tank car remains full of vapor and many purchasers desire to strip this vapor from the tank car. The system in itself is quite simple and similar to

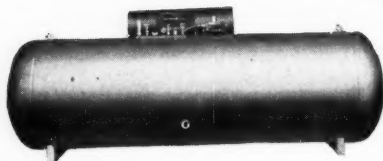
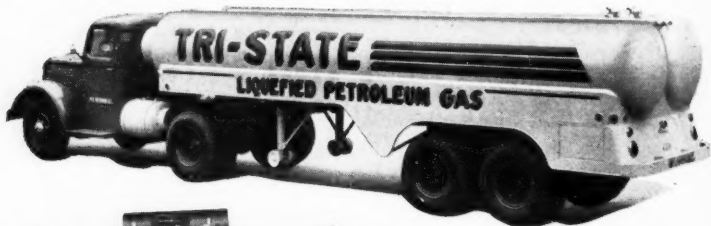
COLUMBIAN



BUTANE-PROPANE

Transport Trucks • Semi-Trailers • Storage Tanks

COLUMBIAN Semi-Trailer Units like the 4,000-gal. double-barreled LPG Transport pictured below, are masterpieces of engineering that give you trouble-free, low-cost operation. Manufactured in any capacity within limitation of your state highway regulations.



COLUMBIAN STORAGE TANKS

(Left) Above-ground and Under-ground storage tanks that are quality built for long years of efficient operation — available in all sizes — all A.S.M.E. tanks.

COLUMBIAN LP-GAS Delivery Tanks

(Right) Full-skirted standard tanks with special cylinder brackets for bottled gas. Pump mounted with direct driven power take-off. All control valves and print-o-meter in rear can box.



Take advantage of Columbian's 55 years of tank building experience—plus a reputation for advanced design and engineering excellence that has won recognized leadership throughout the industry. WRITE NOW FOR COMPLETE FACTS.

COLUMBIAN STEEL TANK CO., P.O. Box 4226-0, Kansas City, Mo.

those systems previously described.

The differential valve on the downstream side of the meter automatically requires a pressure in excess of the vapor pressure of the liquid through the meter system before the valve will open. Under this system it is physically impossible for the liquid in the metering system to flash to vapor when transfer is made to a storage tank which has an initial low pressure.

The second tank car unloading system, known as the vapor exchange system, was developed primarily to strip the tank car of vapor at the conclusion of the transfer operation. It operates by transferring the vapor from the storage tank by a compressor into the tank car to displace the liquid in the tank car and effect a liquid transfer to the storage tank. When the tank car has been emptied of liquid, the direction of vapor flow is reversed by a system of manifold valve, the valve at the bottom of the tank car is closed, and the vapors remaining in the tank car are pumped back into the storage tank through the compressor.

The principal objection to this system from the metering standpoint is the fact that as the storage tank begins to fill with liquid, the compressor will vaporize some of the liquid which has already been delivered to the storage tank and which has already been metered. In addition the vapor being returned from the tank car to the storage tank at the conclusion of the transfer is not metered.

The third system effects the transfer of liquid by introducing air pressure to the top of the tank

car being emptied. We find this system most popular at those industrial plants which buy butane or propane in tank car lots. It is a very difficult system to meter. Under this plan compressed air from an outside source is introduced at the top of the liquid in the tank car, furnishing the excess pressure needed to remove the liquid from the tank car to storage tank.

Controlling the Final Flow

It is necessary that some means be provided to definitely control the flow when the tank car is almost free of liquid and air becomes entrained with the liquid. This is done by adding a diaphragm type control valve which closes and stops the flow of liquid when air collects in the eliminator tank. As the air is expelled from the eliminator tank, bypassing the meter, and the advancing liquid in the eliminator tank closes the release valve, the diaphragm valve opens, again permitting liquid flow. This cycle will repeat until there is no further liquid available.

The diaphragm valve is spring loaded and possesses the added advantage that it acts as a back pressure valve. Flashing through the meter system can only occur at the start of the transfer if the pressure in the storage tank is less than the vapor pressure of the liquid, less the amount of back pressure exerted by the spring loaded valve.

We believe the foregoing explanations cover the greatest use of positive displacement meters in the liquefied petroleum gas industry. We particularly call to your atten-

tion the fact that we have not presented a system employing the use of a positive displacement meter in the filling of cylinders. The filling of cylinders under pressure generally starts with fairly fast flows through the meter which gradually decreases as the cylinders reach capacity. Since the meter must operate over a full range of flow down into the very low speeds, we have not found these installations to be accurate and we do not recommend their use.

We have discussed so far the most prevalent and well known types of LP-Gas meter installations; however, the principal disadvantage in LP-Gas metering in the past has been the necessity of including either a vapor return line or the venting of excess pressure to the atmosphere. This would result in an inaccurate measurement and in either case the buyer suffered a loss.

There is, however, a newer method of metering LP-Gas that has become increasingly popular with various major oil companies.

Here's a Popular New Way

Most liquefied petroleum tanks such as tank cars, truck and bulk storage tanks have as conventional equipment a liquid connection or connections through the shell into the bottom of the tank. In addition, they have a vapor connection also through the shell but leading into the top of the tank. The general practice used in filling these tanks has been to conduct the liquid through the liquid line into the bottom of the tank and as the pressure

built up to a point approaching the safety valve setting to make a vapor connection to the supply tank, allowing the pressure to equalize or by venting sufficient vapors to the atmosphere.

Vapor Loss Can Be Halted

As discussed before, this loss of vapor creates an uncertainty and nullifies the accuracy of the liquid meter. This difficulty has been overcome by several operators with the unique plan of filling all types of LP-Gas tanks either through the vapor connection or by the use of the liquid connection and simultaneously allowing sufficient liquid to pass through the vapor connection maintaining the tank at a favorable pressure.

The most popular theory covering this type of loading is that the liquid entering the tank through the vapor line or conducted to the top of the tank falls through the vapor and is in continuous intimate contact with the vapors, allowing the liquid and vapors to approach equilibrium; as the transfer pressure is always higher than the vapor pressure this results in complete absorption of the vapors.

In this installation since all of the metered material is confined to the tank it will result in an extremely accurate measurement of the actual gallons delivered.

We would like now to present the three accepted methods of proving a liquefied petroleum gas meter. Any meter used in a transfer of products representing a sale will generally come under the jurisdiction of the weights and measures



WHAT'S DIFFERENT ABOUT THIS TANK CAR?

Outwardly there's no difference. The difference is inside, in the Hidden Ingredients contained in every car of SINCLAIR L-P GASES. These Hidden Ingredients are important things like INTEGRITY, REPUTATION, RESPONSIBILITY, PERFORMANCE AND REAL SERVICE.

That's why Distributors like to do business with SINCLAIR . . . year after year. For SINCLAIR is exclusively a wholesaler of Propane . . . and never competes with any of its customers.

SINCLAIR

SINCLAIR PRAIRIE OIL COMPANY
SINCLAIR BUILDING, TULSA, OKLAHOMA
LIQUEFIED PETROLEUM GAS DIVISION

department. However, since this is a limited field and the equipment for testing these units is quite expensive, their testing has not yet become widespread. Some individual operators of liquefied petroleum gas systems have constructed their own units for testing purposes.



WEIGHING THE DELIVERY

The first LP-Gas meter testing system to be constructed to our knowledge was built by the Los Angeles County Weights and Measures Department under the direction of C. M. Fuller. It was a unit designed to actually weigh the delivery and, by comparison with the observed specific gravity of the liquid, determine the exact quantity delivered.

The gravimetric type prover consists of a closed vessel mounted on a beam type scale. The delivery hose from the meter is connected to the vessel inlet and a delivery made to the prover tank. This quantity is not considered a test draft but is made to pressurize the system. The liquid is then returned to storage and the hose connections are

broken. The empty vessel is then weighed and the tare weight recorded. The delivery hose is reconnected and a definite volume equal to the test capacity of the tank is delivered to the prover. The hose is again disconnected and the vessel weighed to determine the gross weight. Subtraction gives the net weight of the delivery.

A specific gravity kit is also required with this equipment. A sample of the liquid is drawn into the device and the specific gravity of the liquid determined. From accompanying tables the weight per gallon matching the observed specific gravity is determined. Dividing the net weight of the delivery by the weight per gallon determines the exact gallonage delivered to the prover tank.

The next system to be built was adopted by two county weights and measures representatives, also in California, first by Mr. Johnson, of Tulare county, and then by Mr. Schilling, of Kern county. These units are a variation of the commonly accepted volumetric proving tank with the exception that they are closed systems with provisions for displacement of the vapor in the test tank at the start of the test.

How Volumetric Differs

The volumetric method offers a variation of the well known atmospheric type proving equipment used on higher boiling point hydrocarbons such as gasoline and heavier oils. It differs in that it is a closed system and provision has been made for the displacement of

the vapor contained in the empty tank with a minimum of condensation.

The tank is first pressurized by an initial delivery and the liquid pumped out of the prover to the zero line on the lower gauge glass. A definite delivery equal to the capacity of the prover is then made by meter reading. The accuracy of the delivery is determined by the liquid level reading in the upper gauge glass.

The third method which is coming into use is a water displacement method. There had been some delay in the adoption of this unit inasmuch as it is a heavier unit for transportation on a small, two-wheel trailer than the first two methods described. It does have advantages in that it prevents all liq-

uid vaporization in the test and accurately indicates the amount of liquid that has been delivered.

The prover tank is first filled with water by pumping from the supply tank. With valve at pump closed, test liquid is delivered to the proving tank and the water displaced to the zero mark on the upper gauge glass, leaving the tank, proper, full of water. The actual test is then made by delivering 50 gallons of test liquid to the prover and displacing the water which flows back to the storage tank through the bypass valve. The accuracy of the delivery is then observed by reading the position of the interface of the two liquids on the bottom gauge glass.

To repeat this test, displace the test liquid back to storage by pumping water into the prover tank until the interface is again at the zero mark on the upper gauge glass. Test may then be repeated as previously described. The water displacement is also used to return test liquid at the conclusion of all testing. Protection of the equipment and easier reading of the liquid interface is provided by using an inhibitor in the water.

No discussion of positive displacement meters in liquefied petroleum gas service would be complete without some mention of preventive maintenance. Due to the fact that this equipment is using a very dry liquid as a lubricating agent, the need for periodic inspection is more important than on equipment operating on other hydrocarbon products. Most meter equipment is provided with some form of adjustment to provide for wear.



**WATER DISPLACEMENT
METHOD**

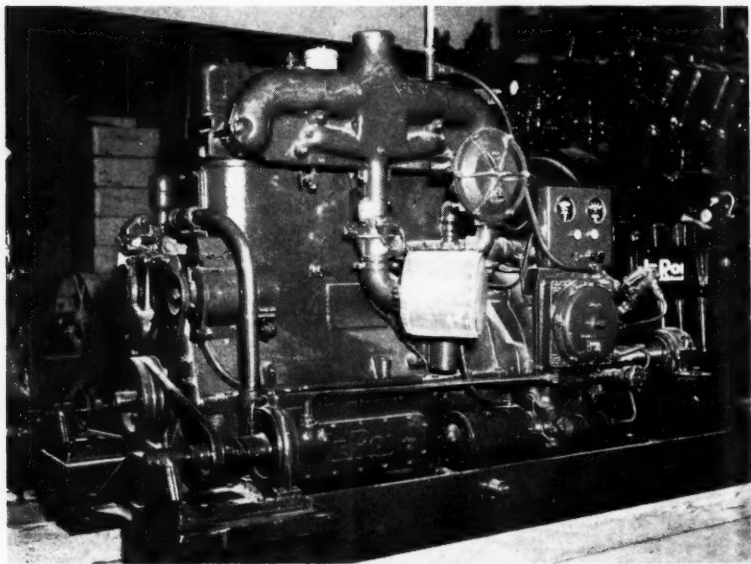
POWER

Positive Lock-Off Regulators

THERE has been developed recently a new series of secondary or atmospheric regulators for use primarily with natural gas but also usable with liquefied petroleum gas fuels. These regulators use the "positive lock-off" principle in the regulator valve. As the valve seat

is on the pressure side of the orifice, it will have a tendency to seat even more securely with the input pressure. This is a development of the American Liquid Gas Corp., Los Angeles, manufacturers of "Algas" carburetion equipment.

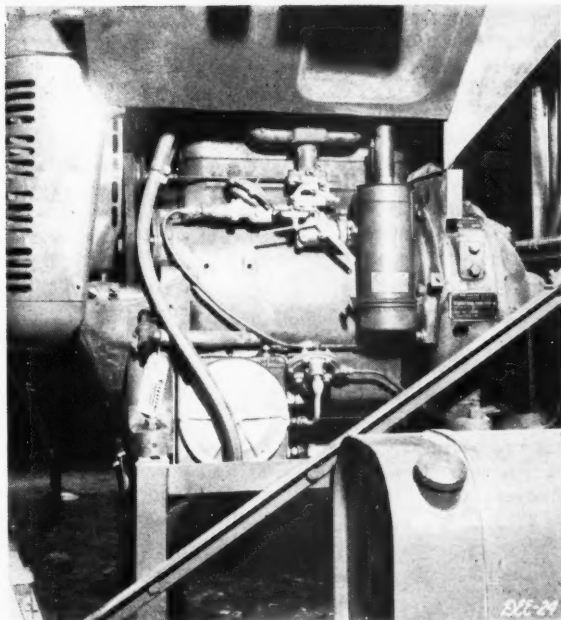
A simple lever mechanism con-



Heavy duty stationary engine operating on LP-Gas. This type furnishes power for generating electricity, pumping water, etc. "Algas" regulator and heat exchanger.

By
STANLEY BELL

Chief Engineer
American Liquid
Gas Corp.,
Los Angeles



"Algas" regulator on International stationary engine.

nects the valve to the diaphragm and, due to the high leverage, the sensitivity is such that the regulator will open at $\frac{1}{2}$ " water column vacuum. Since the valve spring is used only for the purpose of bringing the seat into contact with the orifice so that the input pressure can close it, the unit is very sensitive; consequently the valve opens with little effort as the demand for fuel increases. As a result, the output pressure is constant (at $\frac{1}{2}$ " water column negative) throughout the operating range of the regulator.

The few moving parts are principally constructed of dural, so that sensitivity and rapid response are maintained with strength adequate for dependable service. Another feature contributing to trouble-free operation over long periods of time is the design which permits all fuel passing through the regulator to take a downward course, so that oil or any other impurities which may be found in the fuel may pass into the engine to be burned, instead of accumulating within the regulator to cause sluggish action.

The regulators operate on any

input pressure up to 5 psi without changing the orifice, and are designed so there is no need of any individual adjustment. The regulators are made in three sizes; the smallest for light plants, small stationary engines, tractors, or any engine up to 40 hp; the intermediate size for engines up to 150 hp; and a larger model for the larger engines up to 450 hp.

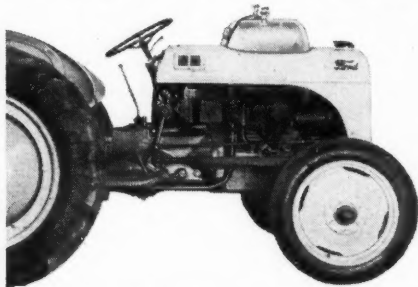
Installation Is Simple

On some types of equipment with which it is desired to operate on either LP-Gas or natural gas, the installation can be made very simple. A heat exchanger is provided which vaporizes the LP-Gas and delivers it to the regulator at 5

psi pressure, and a 2-way valve may be installed ahead of the regulator, thus permitting instantaneous changes of fuels. The natural gas may be used directly from the line at any pressure up to 5 psi to this valve.

Algas also makes a heat exchanger in which the output pressure can be controlled by the operator and delivers vapor at any pressure between 10 and 45 psi. This has found use on tractors equipped for flame cultivation and elsewhere requiring high burner pressure. In such installations most of the vapor is fed to the burners at from 20 to 40 psi pressure, and a part of it is used with one of these atmospheric regulators to run the trac-

Santa Fe TANKS for



A typical installation of a Santa Fe "custom built" LP-Gas tank mounted in place of the gasoline tank.

All tanks manufactured . . . ASME-U69,
according to N.B.F.U. pamphlet 58

Simplified Installation

Santa Fe tanks have been engineered and designed to make installation on tractors fast, simple and inexpensive. Specifications for 35 different tractors are now available. Tanks can be fabricated immediately. You get "custom design" at reasonable prices.

•
Mobile tanks for all tractors
and trucks

•
Santa Fe "Custom Built" tanks are
legal in every state in the Union.

•
**Call, Write or Wire
for Prices and Sizes**

Santa Fe Engineering & Equipment Co. 3812 Fruitland Ave.
Maywood, California

Carburetor Craftsmen for 38 years

ENSIGN progress parallels growth of the engine business!

**STARTED
HERE
IN 1911** ➔



1—ORVILLE H. ENSIGN, inventor founder and formerly chief electrical and mechanical engineer of U.S. Reclamation Service, produced his first successful gasoline carburetor in Los Angeles December 1911.



2—EARLY CARBURETORS incorporating patented Ensign principles were used on tractors, automobiles and trucks.



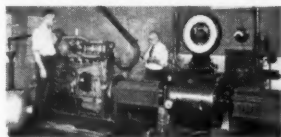
3—HEAVY FUEL CARBURETORS with spark ignited vaporizing chamber were popular on tractors and marine installations.



4—IN 1914 O. H. Ensign with his vigorous little company of technicians moved to new large quarters. Many domestic and foreign sales outlets were established. The majority of tractor builders adopted Ensign as standard equipment.

DECEMBER—1948

In oil fields the world over the name ENSIGN is synonymous with dependability and service.



5—ONLY THE FINEST of laboratory test equipment is used at Ensign's. Many special instruments and machines to aid development of carburetors for natural gas, butane-propane and gasoline are Ensign built.



6—WITH YEARS OF SERVICE to the oil, agricultural and transportation industries the company's continued growth called for additional plant facilities. Today, in its present modern factory employing several hundred persons, every operation from foundry to final testing is completed.

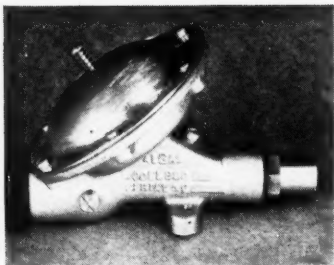


7—THE ENSIGN BRANCH FACTORY at Chicago has for many years offered eastern engine builders prompt and efficient service. Ensign factory engineers and distributors in all active areas are constantly in search of better methods and for opportunities to serve.

ENSIGN

CARBURETOR COMPANY

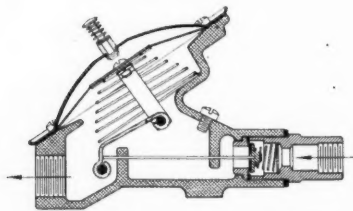
7010 SO. ALAMEDA ST., P.O. BOX 229, HUNTINGTON PARK, CAL.
BRANCH FACTORY: 2330 WEST 58TH STREET • CHICAGO 36, ILL.



Photograph of "Algas" natural and LP-Gas regulator.

tor engines. Variations of input pressure do not affect the operation of the regulator used on the engines.

The Algas heat exchanger units have also been used to excellent advantage to provide fuel for cotton gins, dehydrators, and manufacturing plants, where hot water is circulated through the unit which would vaporize between 30 and 40 gallons of LP-Gas fuel per hour for each unit installed. The units may be manifolded together to furnish gas for all the internal combustion engines, industrial burners, and space heaters



Sectional drawing of "Algas" atmospheric regulator.

throughout the plant. If internal combustion engines are used for a source of power, there is plenty of hot water from the cooling system or individual hot water heater.

From the various regulators manufactured by the American Liquid Gas Corporation, any desired pressure may be obtained from practically atmospheric, inches of water, or pounds per square inch. The flexibility of this equipment will allow the dealer to meet any gas problems presented to him.

Santa Fe Engineering Offers Visible Gauges for Truck Tanks

Santa Fe Engineering and Equipment Co., of Maywood, Calif., is now in production on a new model truck tank which features a visible float gauge. This visible type gauge makes it possible to tell at a glance how much fuel the tank contains.

This new development, which is now available as optional equipment, at no extra cost, came after many months of intensive road tests, according to H. D. Robinson, president of Santa Fe.

Mr. Robinson points out that their present line includes many models especially designed for easy installation on various makes of tractors. This development came from a constant, close association with the power side of the industry, Mr. Robinson points out.

A second important feature of the new model includes a bolted metal guard which is installed in place of the usual welded type. This makes it possible to remove the guard within a few minutes if it is necessary to work on the tank's fittings.

A third feature, which contributes

THERE GOES *another Load* OF TANKS FROM McNAMAR

"You Can Depend on McNamar!"



2 PLANTS KEEP DEALERS WELL SUPPLIED



Plant #1 — Tulsa, Oklahoma



Plant #2 — E. St. Louis, Ill.

ORDER FROM THE McNAMAR PLANT NEAREST YOU!

A BIG SELECTION OF LP-GAS SYSTEMS

Now on McNAMAR YARDS *for Prompt Delivery*

SAVE FREIGHT COSTS AND TIME...

ASK ABOUT OUR NEW 3-WAY DELIVERY PLAN

- STORAGE VESSELS
- L-P GAS SYSTEMS
- ANHYDROUS AMMONIA VESSELS
- PIPE — REFINERY VESSELS

ASME API ASME CODES — NATIONAL BOARD INSPECTION

McNAMAR BOILER AND TANK CO.

TULSA, OKLAHOMA
BOX 840

EAST ST. LOUIS, ILL.
BOX 206



Truck supply tank with visible gauge.

to safety and simplifies use of the tank, is the printed labels that are welded below all outlets. These allow instant recognition of all hose connections.

All Santa Fe tanks are built in accordance with NBFU regulations and carry UL fittings. They are legal for use in every state in the nation. Tanks are machine welded. Each is thoroughly drained and dehydrated before completion to eliminate moisture. All tanks are shipped with a light head of air pressure to eliminate any condensation.

New Propane Gas Plant Opens in Turner Valley

Manufacture of propane gas in commercial quantities started in Canada for the first time recently with the official opening of the Western Propane, Ltd., of Calgary, plant in the Turner Valley oil field.

Small quantities of propane gas have been manufactured and sold in Canada as a minor by-product of oil refineries. However, the new \$500,000 Turner Valley plant is believed to be

the first constructed solely for the manufacture of the gas. It uses natural gas that formerly was "flared" or wasted at the well-head.

New, 24-hour Service Station Will Cater to Butane Trucks

Burbank, Calif., is to have a super-butane truck station where fuel and services will be available 24 hours a day. Conversions will be made and automotive vehicles will be repaired day or night.

To be sure, gasoline and diesel trucks and cars will be served also. In fact, the new station, to cost half a million dollars, is located on San Fernando Road, the main inland highway to northern California, and will offer all manner of automotive services, including motor and body repairs, wash and grease racks, a 60 ft. pit to take a truck and trailer at the same time, electrical work, wheel alignment, painting and upholstering. The plan provides for the equivalent of work on an assembly line basis. Or, you can even buy a new

The Winter Air Conditioner

that meets the needs of most houses!

MOHAWK

Winter Air Conditioner

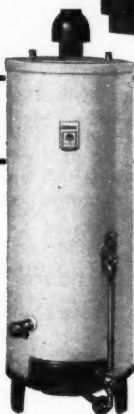
Features cast iron burner with patented high temperature alloy, corrugated ribbons . . . durable cast iron heating element proportioned for maximum heat absorption, with section halves tightly joined for leakproof union . . . pre-heating of return air for fuel economy. Available in 9 sizes, ranging from 60,000 to 300,000 Btu. input per hour.



BUDGET

Automatic Storage Water Heater

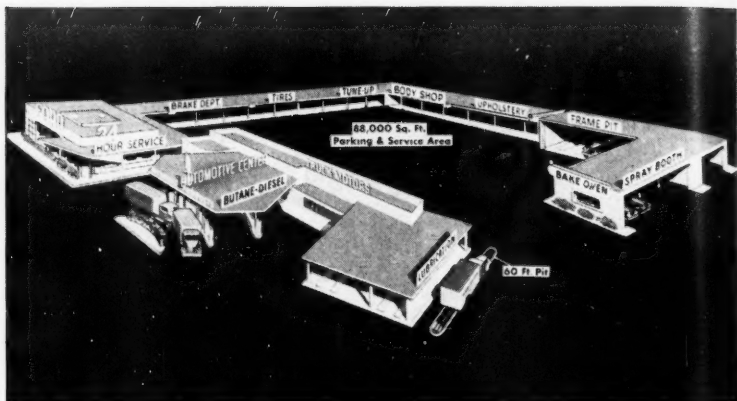
Has fuel-saving cast iron blue flame burner and safety controls. Center flue with spiral baffle insures quick recovery. Rockwool blanket insulation between heavy galvanized steel tank and trim jacket prevents heat loss, increases efficiency. Comes in 3 sizes—20, 30, and 40 gallon capacities.



AMERICAN-Standard
First in Heating and Plumbing

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON



This new Burbank, Calif., service station will cater specially to trucks, including those using LP-Gas.

Ford—when there're enough to go around.

To be known as the Automotive Service Center, the plant will open late in January under the ownership of the Snyder-Lynch Motors, Inc., of which Jack Snyder is the principal stock holder; George E. Gansell, general manager, and Guy E. Bohan, sales manager.

Mr. Snyder expects it will take 150 experts to man all the operations offered. There will be 12 fuel pumps. The butane storage tank will be of 10,000-gal. capacity and set underground.

Texas Fuel Commission Will Function Again

Gov. Beauford H. Jester, of Texas, took steps recently to avert a shortage of liquefied gas when cold weather hits. He reactivated the emergency fuel commission that functioned during the butane shortage

last winter and called a meeting of dealers in Austin on Nov. 23 to advise on methods for supplying cold weather needs. He said these were only precautionary moves and the state has no legal authority to regulate the distribution of butane.

Last year, however, the commission was able to alleviate the gas shortages to some extent by persuading producers to divert 3,000,000 gallons of butane from industrial to domestic use.

Standard of California Buys Interest in N. J. Refinery

Standard Oil Co. of California has exercised its option to purchase the minority interest in California Refining Co. held by the Barber Oil Corp.

California Refining operates a refinery at Perth Amboy, N. J., and will now become a wholly-owned subsidiary of Standard of California.

Partial List of Contents

WHAT IS PROPANE? — Supply. Properties. Definitions.

THE BEHAVIOR OF GASES — Pressure. Specific Gravity. Density. Compression.

WHAT GOES ON IN A PROPANE CYLINDER? Construction. Filling.

THE SIMPLE REGULATOR — Design. Problems and Cures.

REGULATOR MANIFOLDS — Service Problems. Multiple Installations.

REGULATIONS — Equipment Selection and Installation. Domestic. Industrial. Safety.

BURNER DESIGN AND APPLICATION — Ports. Orifices. Burner Installation.

APPLIANCE CONVERSIONS — Inputs for Domestic, Commercial and Industrial Burners.

FACTS ABOUT WATER AND WATER HEATERS—The Effects of Water on Heaters. Usage Tables.

TYPES OF WATER HEATERS—Installation. Safety Devices. Efficiency.

DEALERS, SALESMEN, SERVICEMEN

Are you closing the door to future sales by giving incomplete answers to your prospect's questions? Can you compare butane-propane costs and safety with electricity in your area?

BUILD YOUR FUTURE EARNINGS BY LEARNING THE FACTS TODAY. The Bottled Gas Manual provides 352 pages of easy-to-read information on selling and servicing LP-Gas and appliances.

Order Your Copy Today

Price is \$4.00 per copy. We pay postage on orders accompanied by check or money order. In Calif. add 12c for sales tax.

BUTANE-PROPANE News

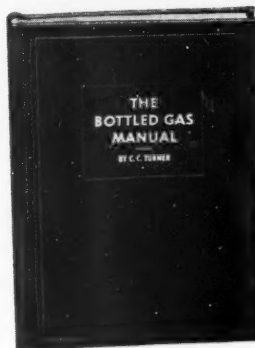
198 S. Alvarado, Los Angeles 4, Calif.

LP-GAS PIPE LINES — Friction. Sizes. Formulas. Charts.

TESTING FOR LEAKS AND ADJUSTING BURNERS — Flame Characteristics. Servicing.

FUNDAMENTALS OF THERMOSTATS — Types. Service. Expansion of matter under heat.

PILOTS AND PILOT CONTROLS — Types. Causes of Failure. Adjustment. Safety Pilots.



THE BOTTLED GAS MANUAL

SELECTING AND INSTALLING WATER HEATERS — Demand Analysis. High Bill Complaints. Service Problems. Peak Demands.

COMPETITIVE FUELS — WOOD, COAL, OIL. Heat Content. Efficiency. Competitive Figures.

COMPETITIVE FUELS — ELECTRICITY — Rates and Refrigeration. Meeting Electrical Competition.

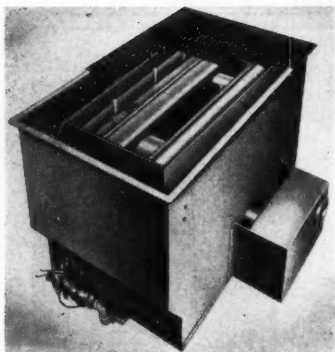
COMPETITIVE FUELS — ELECTRICITY — COOKING AND WATER HEATING — Operating Costs. Fire Hazards. Relative Merits.

GAS LIGHTING — Law Governing Transmission of Light. Relative Costs. Value to Industry.

SPACE HEATING — Estimated Requirements. Proper Sizes. Types of Heating Equipment.

THE TOOLS OF OUR PROFESSION

PRODUCTS



Floor Furnace

Tennessee Enamel Manufacturing Co., Nashville, Tenn.

Model: Temco 506-1.

Application: Domestic floor furnace.

Description: Temco's new shallow gas floor furnace measures only 25½ in. overall depth practically eliminating costly excavation for installation.

The unit is equipped with a porcelain enamel heat chamber which is guaranteed not to rust, corrode or burn out. The new model provides a recessed, easily accessible, compact control assembly which greatly simplifies installation and maintenance. A ceramic port burner is incorporated to further improve the efficiency and lasting quality of the unit and a deep drawn, streamlined bottom pan is provided.

Standard equipment on all models

includes 100% safety pilots. Automatic electric temperature controls are optional, but, when specified by purchaser, are installed at factory. The company will produce a complete line of these floor furnaces, including 35,000, 50,000, and 70,000 Btu models.

Domestic Range

Detroit-Michigan Stove Co., 6900 E. Jefferson Ave., Detroit, Mich.

Model: Garland No. 47-41017 and Detroit-Jewel No. 47-71017.

Description: These new ranges are constructed with a one piece cooking top and backguard and are so built that they can be located flush to kitchen wall.

Height of the cooking top has been increased to 36 in. and a new light



BUTANE-PROPANE News

and time reminder assembly has also been incorporated. These changes are in addition to the regular features of the standard Garland and Detroit-Jewel models such as "Zimmer-Kook" top burners, "Fla-Ver-Seal" broiler and "Even-Temp" oven.

Pipe Mending Cement

Lake Chemical Co., 607 N. Western Ave., Chicago.

Model: Plumber Krak-Stik.

Application: This is a positive seal for repairing split soil pipes, sand-holes, cracked pipes, gaskets, etc.

Description: A pipe mending compound in stick form, this seal assures



a positive seal for water, gas, acids and brine. According to the manufacturer, it stops the leak instantly even while liquid runs through the pipes under pressure or remains in the container.

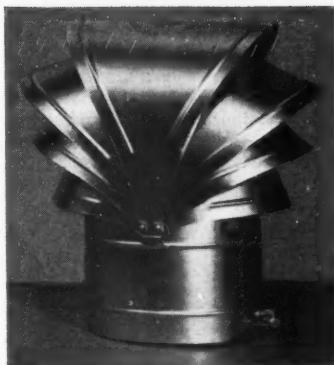
In operation, the stick is rubbed heavily over any crack or leak. The pipe surfaces do not have to be prepared before application.

Chimney Extension

Artis Metals Co., Inc., P. O. Box 1642, Boise, Idaho.

Model: Artis Vacuum Caps.

Application: For use with gas heaters.



Description: Air currents across the top of the cap form a partial vacuum, relieving the chimney of generated gases. The design of the vacuum cap cuts down the down draft, according to the manufacturer.

It is painted aluminum inside and outside, when made of steel. The caps range in sizes from 2 in. to 12 in.

Many advantages are evidenced by use of this cap. Among those claimed are increased draft; elimination of back draft; cleaner chimney; cleaner stove; protection of pilot lights, and elimination of condensate.

Console Heater

Rheem Manufacturing Co., 570 Lexington Ave., New York.

Model: Series 1700-25, 35, and 50.

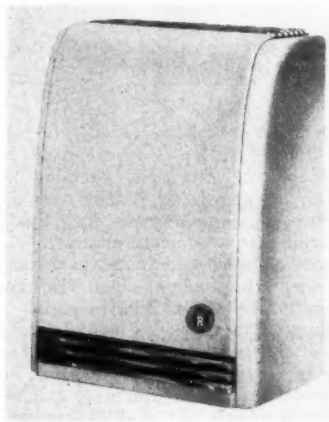
Application: Designed to serve small homes comfortably and to provide auxiliary heating for from one to four rooms in larger homes.

Description: This heater is of all-steel, welded construction with die-formed steel heating elements which are seam welded for gas-tight operation. Scientifically designed, full flow

grilles direct heated air out into room. Louvers at front and rear of casing serve as cold air returns.

The cast iron burner with raised-portal construction aids combustion, it is stated, and is available for any gas. The pilot is protected from sudden down drafts by built-in down-draft diverter and insures positive relighting of main burner.

Series 1700 ranges in Btu input



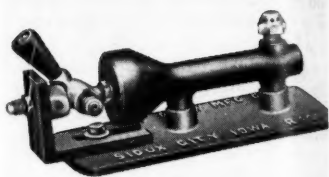
sizes from 25,000 to 50,000. The heater is finished in a baked-on walnut finish. The casing temperature is maintained at minimum level with inner liner construction.

Gas Burner

Golden Glow Manufacturing Co.,
Sioux City, Iowa.

Model: "Miracle" bottled gas burner.

Application: Designed to replace oil lamp or electric units for automatic stock waterers.



Description: The burner is constructed of cast iron with solid brass burner head and non-corrosive gas cock. All bolts used for assembly are plated.

It is ideal for use under steam tables or any place where burner of 3000 Btu is needed.

Specifications: 3½ in. high, 10 in. long and 3¼ in. wide. It weighs 4 lbs.

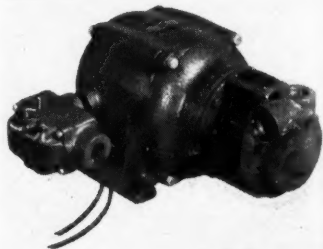
Bottle Pump

Corken's, Inc., LP-Gas Equipment
Dept., 206 E. Grand Ave., Oklahoma
City, Okla.

Model: No. 10 Bottle Pump.

Description: The Model 10 is the result of two years' field study of bottling requirements in the LP-Gas industry to perfect an efficient and low first cost pump.

It was developed at the plant of a gas dealer serving all types of bottle trade, from trailers to 100 lb cylinder.



BUTANE-PROPANE News

ders, and the capacity and pressure characteristics are determined from this experience.

The packing system was proven in tests at Corken's own propane experimental station, and with three years of field experience plus hundreds of experiments to draw from, it was possible to develop a packed box that is easily controlled.

Ability to operate under adverse installation conditions; ruggedness and plenty of capacity and pressure, make this unit a real help to LP-Gas dealers.

This pump is powered by a master $\frac{3}{4}$ hp, 115 volt, single phase explosion-proof motor, and explosion-proof switch, and utilizes a floating impeller which greatly prolongs its life.

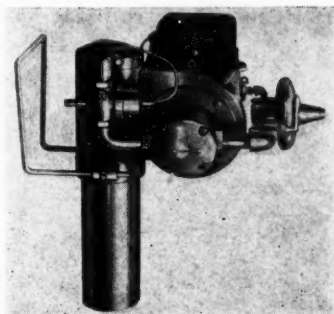
Conversion Burner

Mid-Continent Metal Products Co.,
1960 N. Clybourn Ave., Chicago.

Model: Lo-Blast "Economite."

Application: Conversion burner for domestic installation.

Description: Incorporation of the superior features that are included in the present Lo-Blast burner assures high efficiency and flexibility of application, especially as equipment for



combination oil and gas-designed boilers and furnaces.

The new burner uses a 1/40 hp motor blower which provides proper air conditions for combustion regardless of draft through the furnace. Electric ignition with interlocking safety pilot control is also incorporated.



Gas Range

Grand Home Appliance Co., 2323 E.
67th St., Cleveland.

Model: 849 (949 with CP specifications.)

Description: While no radical changes have been made in the various units or functional features, the model is new and different in appearance. New bar-type door handles are finished in chrome and extend the entire width of the doors. Chrome trim has also been used in the instrument panel and in the deluxe mantel back.

Standard equipment of the range includes two ovens consisting of an oversize bake oven and a separate meat oven; "Charcol-Ator" broiler in the meat oven; click gas cocks and

simmer settings on all top burners; and the "Safe-Tee-Kee," an exclusive device which enables the user to shut off gas to all burners when the range is not in use.

Accessories include: deluxe mantel back with fluorescent lights, electric clock, interval timer, electric convenience outlet, and salt and pepper shakers; glass door for the bake oven; and a griddle plate which can be placed over any pair of cooking top burners.



Globe Valve

Wm. Powell Co., 2503 Spring Grove Ave., Cincinnati.

Model: 8150.

Application: Designed and built to meet growing demand for equipment to control the flow of liquid or gaseous butane, propane, and other hydro-

carbons in domestic and industrial services.

Description: This is a bronze globe valve with screwed ends, union bonnet and renewable, special composition disc. It is built for 400 lbs pressure with water, gas, and oil.

The one-piece tubular packing and the discs for the Powell globe, angle and check valves are made of a special composition, proved by test and actual usage to provide utmost resistance to action of LP-Gas. This special composition is hard enough to withstand long wear and is pliable enough to assure a tight seal against leakage.

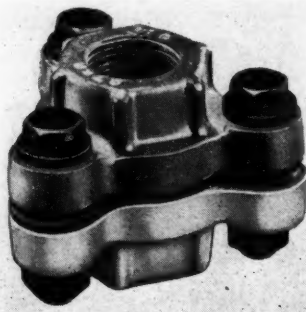
All of the trim and internal working parts of the valves are easily and quickly renewable.

Union Fitting

Hotstream Heater Co., 2363 E. 69th St., Cleveland.

Model: "Dielectric Union."

Application: Designed to increase the life of the plumbing system by eliminating electrolytic corrosion where ferrous and nonferrous metals are joined and prevent the damaging effect of electrolysis upon galvanized



BUTANE-PROPANE News

storage tanks and nipples when connected with copper plumbing. It should be used wherever two dissimilar metals are joined by usual plumbing methods.

The union consists of two specially designed pipe flanges, one made of iron and the other of bronze. Both parts are insulated from each other by a carefully selected non-conductor gasket while the connecting bolts are insulated from the bronze section of the union by non-conductor bushings. All ferrous parts of the union are rust-proofed to insure longer service.

The installation of the Dielectric union completely breaks the electrical circuit between the galvanized iron and the copper, preventing electrolysis, because the iron section is connected to the galvanized pipe fittings of the water heater or any other ferrous unit while the bronze section is connected to the copper tube fittings.

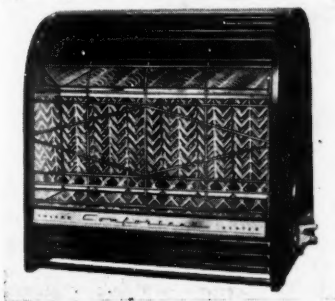
The 3/4-in. female IPS size is now available with other sizes planned for future production.

Radiant Heater

Inland Steel Container Co., 6532 S. Menard Ave., Chicago 38.

Model: "Comforteer Radiant-Circulator."

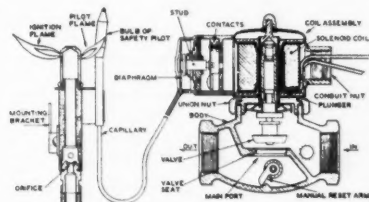
Application: Domestic installation.



Description: This new heater is a companion model to the "Comforteer Circulator" with the additional advantages of direct, penetrating, radiant heat. Polished reflectors and six clay radiants throw direct rays in four directions.

The dimensions are 13 1/4 in. deep x 20 in. wide x 18 in. high. The cabinet is of all-steel, spot welded construction. The burner is cast in a single piece with slotted type raised ports. All units are securely assembled with standard stove bolts.

This unvented heater has a rated input of 25,000 Btu's per hour. It is made in four models—one for each type of gas. The valve of the heater is equipped with a fixed orifice cap for the specific type of gas to be used.



Solenoid Gas Valve

White-Rodgers Electric Co., 1209 Cass Ave., St. Louis, Mo.

Model: Combination Solenoid Gas Valve and Safety Pilot.

Application: Designed for use on gas-fired furnaces, boilers, unit heaters, floor furnaces, and central heating plants.

Description: The valves are equipped with a safety pilot that is connected in series with valve coil internally, so that when the flame of the safety pilot goes out, it opens the

circuit to the valve and prevents the flow of gas.

When the pilot flame is ignited, it heats the bulb of the safety pilot. This bulb, together with the capillary and the diaphragm, is filled with a liquid. The pilot flame causes the liquid to boil, the resulting vapors cause the diaphragm to move to the right, and the movement actuates the stud which in turn closes the contacts. When these contacts and the thermostat and limit control contacts are closed, the solenoid coil is energized, lifting the plunger and valve and opening the main port.

If the pilot flame goes out, the bulb cools off, the vapors condense to a liquid and the diaphragm moves to the left. This opens the contacts of the safety pilot and prevents the solenoid valve from opening.

Gas Furnace

Ingersoll Utility Unit Div., Borg-Warner Corp., 321 Plymouth Court, Chicago.

Model: Ingersoll "88" Furnace.

Application: For heating homes, apartments, stores and offices.

Description: The "88" is slim and tall, occupying the least possible floor space for a furnace of its size and capacity (50,000 Btu). The internal working parts have been assembled vertically.

A 4-in. vent from top of furnace connects directly to flue pipe. A grill in front of built-in draft diverter is removable for easy cleaning of internal surfaces. The combustion chamber is of one-piece, 12-gauge steel with joints welded and fume-tight.

The cast-iron burners, with drilled ports, are designed for LP-Gas, natural, and manufactured gases, and are equipped with automatic pilot

valve and manual main-control and pilot valve. There is also 100% shut-off in event of pilot failure.

The furnace can also be used to provide filtered summer ventilation through a slow-speed, silent, dynamically balanced, multiple-blade blower. The blower provides gentle circulation of filtered daytime air, or can be used for night cooling to introduce fresh, outside air into rooms.

Overall dimensions: length, 32 in.; width, 12 $\frac{3}{4}$ in.; height, 88 in.

Leak Detector

Test-A-Leak Co., 506 S. Wabash Ave., Chicago.

Model: "Test-A-Leak."

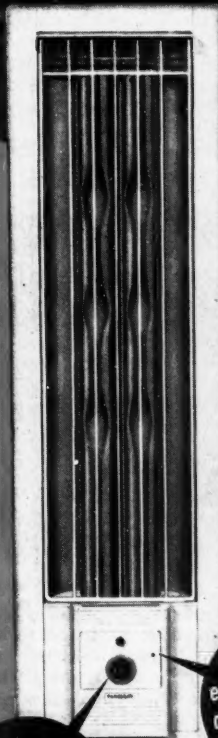
Application: New method for finding leaks in all gas lines, connections and containers.

Description: This is a new applica-



TRIMATIC PANELRAY*

*Leads in low cost
automatic heating*



The Panelray infra-red ray wall heater is now available with full automatic temperature control, factory installed. All controls are included in the pipework assembly in the base of the heater, requiring no wiring or extra work during installation.

Here are the advantages of the TRIMATIC PANELRAY:

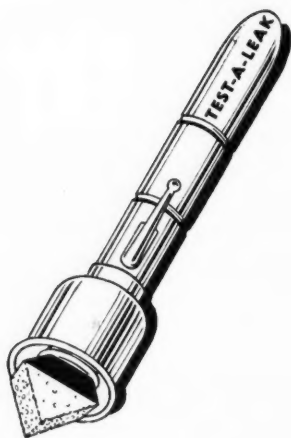
1. Requires no wiring or installation of thermostat or parts.
2. All sizes of dual models may be automatic on both sides.
3. Safety pilot control feature is an integral part of each thermostat. (100% safety on heaters equipped for L. P. Gas.)
4. Closer maintenance of desired temperature.
5. Important new lower prices for automatic operation.

SELL TRIMATIC PANELRAY

* Trade Mark Reg.
U.S. Pat. Off.

DAY & NIGHT

DAY & NIGHT MANUFACTURING CO., MONROVIA, CALIF.



tion of the brush and soap test procedure. The brush with the solution in it is slightly larger than a fountain pen and is easy to carry in a shirt pocket.

The "Test-A-Leak" makes it easy to test in hard-to-get spots and close connections, according to the manufacturer. It is suitable for installation, service, and appliance work and can be used in the coldest or warmest weather.

Only 10 seconds are required to test any joint or connection.

Circulator Heater

Chattanooga Implement & Manufacturing Co., Chattanooga, Tenn.

Model: 820 Royal Vented Circulator.

Application: Domestic installations.

Description: The vent outlet is placed low at a height to make a short, inconspicuous connection into

the fireplace, when this type of installation is made. The draft diverter is completely enclosed in the cabinet so that the appearance of the heater is streamline. The manifold extends through the lower back of the cabinet which makes it easy to connect to the gas line.

The Royal 820, a 20,000 Btu model, is the first of a new series and will soon be followed by models of 40,000 and 60,000 Btu capacities. These larger circulators will be furnished either with or without radiants and with or without circulating fan.

The present model is designed for



use with all types of gases, LP-Gas units being developed and tested entirely on LP-Gas. The heater carries the seal of approval of the AGA Testing Laboratories for all types of gases.

Trailer Heater

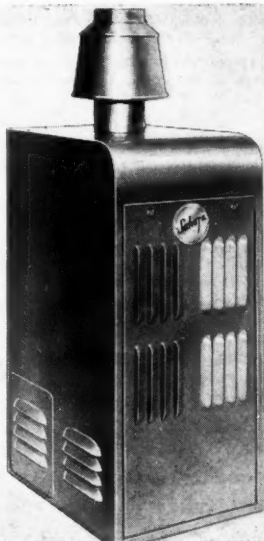
Sahara Heaters, Inc., 1991 Woodward Ave., Berkley, Mich.

Model: New 1949.

Application: Designed for house

trailers, cabins and small cottages using LP-Gas.

Description: This fully vented, automatic heater is controlled by a wall thermostat which can be located where desired. Air is circulated by a 6-in. fan with a 350 CFM rating.



All working parts are easily accessible. The all-welded heat chamber is encased in an insulated casing with tan baked enamel finish.

Overall size: 28 in. high; 12½ in. wide; 18 in. deep.

Bungalow Range

Oakland Foundry Co., Belleville, Illinois.

Model: No. 8438.

Application: Domestic cooking, heating, and trash-burning.



Description: This three-phase range has a built-in, kitchen-heating unit and a trash burner. A specially designed air space around heating section circulates warm air through cast iron louvers in top. There are individual drip pans around burners, automatic oven controls. Roll-out broiler operates on roller bearings. There is an automatic top burner lighting feature. Size: 37 in. x 26½ in. x 36 in. Weight: 350 lbs.

Paul Took's Opens Plant At Pauls Valley, Okla.

Paul Took's, former owner and operator of the Whiteway Butane Gas Co., at Oklahoma City, has started the Valley Butane Gas Co., at Pauls Valley, Okla. He established this business on July 15, 1948.

Mr. Took's is operating in three towns and the surrounding territory at Lindsay, Lexington and Purcell, Okla. He operates three delivery trucks, one at Lexington and the other two in the rural areas surrounding Lexington and Purcell.

Use PITCO
'KEEP 'EM FRYING'
Frialators
REG. U.S. PAT. OFFICE

**SAVE FAT . . . GAS
SPACE**

***Deep-Fat Frying
at Its Best***

- ★ Customers can serve a wider variety of fried foods.
- ★ Left-overs or by-products quickly converted into daily specials.
- ★ Increase in customer business means increase in the gas load.
- ★ Actual saving in fat alone more than pays total cost of gas required to operate them.

**J. C. PITMAN & SONS
SALES CORP.**
711-719 Broad St.
West Lynn, Mass.

CALENDAR

All associations are invited to send in dates of their special and annual meetings for this calendar.

Dec. 7—Wisconsin LP-Gas Assn. Wisconsin Rapids.

Dec. 10—Natural Gasoline Assn. of America. Herring Hotel. Amarillo, Texas.

Dec. 13-14—National Butane-Propane Assn. Board of Directors. Jefferson Hotel. St. Louis, Mo.

1949

April 11-12—Tennessee Liquefied Petroleum Gas Assn. Andrew Jackson Hotel. Nashville.

April 20-22—Natural Gasoline Assn. of America. Texas Hotel. Fort Worth, Tex.

May 9-11—Liquefied Petroleum Gas Assn. Annual Convention and Trade Show. Palmer House. Chicago.

May 25-27—Gas Appliance Manufacturers Assn. Annual meeting. Drake Hotel. Chicago.

Sept. 19-21—National Butane-Propane Assn. Convention and Trade Show. Jefferson Hotel. St. Louis.

Essotane Standard Oil to Build Bottled Gas Plant in N. C.

Preliminary operations in the construction of a new Standard Oil Essotane plant near Wilmington, N. C., to handle bottled gas will begin this month, according to J. Laurens Wright, Standard district manager.

The plant, to be built on a 65-acre site about a half-mile south of the city, will be much larger than the terminal plant (17 million-gal. capacity) already established there, Mr. Wright said.

Actual construction of the building will depend on the availability of materials, but grading and levelling of the land is expected to start within a month.

Fuel Requirements for Space Heating

AT the LPGA service school held at the University of Pittsburgh in September, a handy table was presented by the Heating Research Corp., of Anderson, Ind., which is

passed on to dealers for quick figuring when estimating fuel consumption for space heating.

Paste Table 1 in your notebook for ready reference.

TABLE 1. FUEL CONSUMPTION ESTIMATES—LP-GAS

To estimate fuel consumption for heating only, as shown in Table 1: Select Btu consumption per thousand Btu heat loss per degree day. Multiply by degree days for locality.

Divide total by Btu in unit of measurement—cubic foot, pound, or gallon. Multiply by number of thousand Btu loss of heated space.

Temperature Rise	Btu Heat Required	80% Efficiency	75% Efficiency	70% Efficiency
100 —30 to 70 F	240	300	320	343
90 —20 to 70 F	267	334	356	381
80 —10 to 70 F	300	375	400	429
70 0 to 70 F	343	429	457	490
60 10 to 70 F	400	500	533	571
50 20 to 70 F	480	600	640	686
40 30 to 70 F	600	750	800	857

Example: Pittsburgh, Pa.—Design temperature —0 to 70 degrees F. 70° Temperature Rise, assume 75% efficiency of heater—457 Btu consumption per thousand Btu loss per degree day. Pittsburgh has 5430 degree day average with peak month average—January 19.1% of total. 5430×457 equals 2,481,510 Btu per thousand Btu loss—985 cu. ft.—115 pounds. 27 gallons (commercial propane—2520 Btu per cu. ft. 21,560 Btu per pound. 91,500 Btu per gallon).

Assume 30' x 40' FHA specification one story residence—60 Btu loss per sq. ft.

12 sq. ft. \times 60 equals 72,000 Btu loss. Season's fuel consumption would be 70,920 cu. ft., or 8280 pounds, or 1944 gallons of propane. Peak month's consumption—January—13,545 cu. ft., or 1581 pounds or 371 gallons of propane.

THE TRADE

Frank Andrews, sales manager of the Sid Richardson Gasoline Co., Fort Worth, Texas, has announced the appointment of E. Q. Beckwith as manager of liquefied gas sales for that company.



E. Q. BECKWITH

The Sid Richardson Gasoline Co. is building a large natural gasoline plant in the Keystone Field near Kermit, Texas. Present plans call for the plant to be completed and in operation by February, 1949, with a daily average production of approximately 100,000 gallons of propane and butane and 100,000 gallons of natural gasoline.

Mr. Beckwith is well known in the liquefied petroleum gas industry and has had wide experience in LP-Gas sales, engineering and product procurement work with both the Phillips Petroleum Co., of Bartlesville, Okla., and Beacon Petroleum Co., of Tulsa, from which latter company he resigned as president on Sept. 15.

Mr. Beckwith's new address is 629 Fort Worth Club Bldg., Fort Worth, Texas.

Roger C. Cottrell, 46, president of Midland Parts & Bearings Co., of Kansas City, Mo., and Irving, Kan., passed away suddenly of a heart attack on Nov. 5, at the home of his mother in Irving, Kan.

Mr. Cottrell was known to many in the LP-Gas business both dealers and other distributors of supplies and equipment. He was one of the first in the field to develop a specialized service on small fittings and tubing required in installation and maintenance of LP-Gas facilities. From a tractor and implement parts service started at Irving, in 1920, he had built his company to a distributing service well known in all parts of the country. In the fall of 1935 the present organization was incorporated and a warehouse established in Kansas City, where his specialized service for the LP-Gas field was placed in full swing.

Mr. Cottrell will be remembered as "Roger" to many of his friends throughout the industry, and as one who had a sincere urge to help a new industry grow.

Cecil C. Redding, formerly with the American Stove Co., has recently joined the Delta Tank Manufacturing Co., Inc., Baton Rouge, as their Texas sales and service representative, with headquarters at San Antonio.



C. C. REDDING

Mr. Redding's 20 years' experience in the gas business started with the Lone Star Gas Co. in 1925. In 1927 when Lone Star began LP-Gas serv-

ice to customers, he was responsible for many of the first installations.

Since that time Mr. Redding has spent much time in training programs and study of other phases of the industry with the result that his interest in the field is current.

From his years of experience, Mr. Redding has drawn this working philosophy: "Customer service is what you're selling, regardless of the product."

Appointment of P. C. Thomas as general sales manager of Shell Oil Co., Inc., in the West was announced recently by J. G. Jordan, marketing vice president.

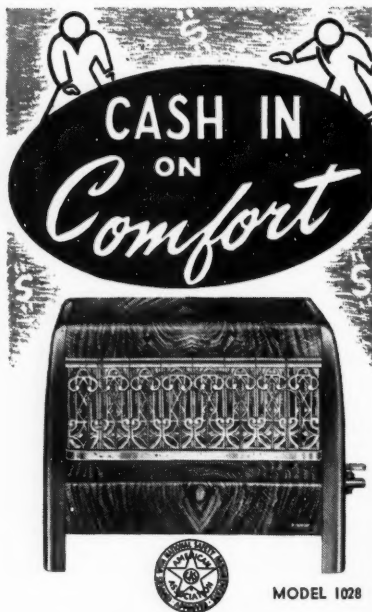
Mr. Thomas, former manager of Shell's Southern California Division, will headquarter in San Francisco where his functions will include supervision of all marketing department activities, both sales and operations, for the area West of the Rocky Mountains, including the Hawaiian Islands.

A Michigan couple, Mr. and Mrs. D. Jay Mathews, of Burr Oak, who have used a Tappan Yucatan Eclipse stove continuously for 52 years, have had it replaced with a de luxe model Tappan-Philgas LP-Gas range.

Mr. Mathews bought the Yucatan model on Oct. 16, 1896, from Beverly E. Seaver, owner of a Burr Oak hard-



It was a happy day for Mr. and Mrs. D. J. Mathews, of Burr Oak, Mich., when their 52-year-old Tappan Yucatan Eclipse model was replaced with a new Tappan-Philgas range.



All Premier Gas Heaters are A.G.A. approved for use with L.P. gases as well as natural and manufactured.

NOW — get set for brisk sales this winter with the four great Premier Radiant Gas Heaters. A.G.A. approved ratings range from 16,000 B.T.U. to 32,000 B.T.U.—just right for your market.

Cash in on comfort with these fast-selling, profit-making heaters. Attractively styled—superbly finished in beautiful walnut grain.

Just a few choice dealer and distributor territories available—write for full details today!

Premier
SINCE 1912
STOVE COMPANY

100 South Sixteenth Street Belleville, Illinois

ware store. Before making the purchase, Mr. Mathews had traded one of his horses to a neighbor for 40 bushels of corn and another horse. He then sold the corn to Mr. Seaver for 28 cents a bushel and with the \$11.20 he bought the stove.

Present at the ceremony in Burr Oak were: Don Keeslar, Keeslar Home Appliance, Sturgis, Mich., who installed the range; Leonard Nyberg, district salesman for Philgas Co., who gave the Mathews the bottled gas installation; Mr. Seaver, the salesman who sold the Mathews the Yucatan model 52 years ago; and Paul I. Berno and Gene Dunaway, representing the Tappan Stove Co.



B. L. LERCH



O. D. SHADDOX

J. F. Ray, director of sales for General Controls, has announced the appointment of B. L. Lerch as factory branch manager of the new St. Louis office, effective last August. The new St. Louis office will serve the eastern half of Missouri, southern Illinois, southwestern Indiana, western Tennessee, northeastern Arkansas and northern Mississippi.

O. D. Shaddox was appointed factory branch manager of the new Oklahoma City office. The new Oklahoma City office will serve all of

Oklahoma and all but the northeastern part of Arkansas.

The addition of these two new offices makes a total of 17 factory branches throughout the country to serve General Controls' customers. Distributors in principal cities also handle General Controls' line of automatic pressure, temperature, level and flow controls.

The new 1948 edition of "Magic Chef Cooking" is just off the press and ready for distribution. This is a completely new revision of the cook book that has been used in homes, schools, laboratories, and home demonstration kitchens for 25 years and is published by the American Stove Co., makers of "Magic Chef" ranges.

The new edition of "Magic Chef Cooking" is a full color, plastic bound

book of 140 pages and was prepared and edited under the direction of Dorothy E. Shank, nationally known home economist. It retails at \$1.50.



J. E. WYATT, JR.

Appointment of J. Edward (Ed) Wyatt, Jr., of Dallas, Texas, as division manager in the Texas area has been announced by Cecil M. Dunn, director of sales, Estate Heatrola division, Noma Electric Corp.

Mr. Wyatt came to Estate from Norge Division of Borg-Warner Corp., where he was manager of contract sales. Previously

FOR SALE

Repossessed New L.P.G. Merchandise

We offer, subject to prior sale the following:

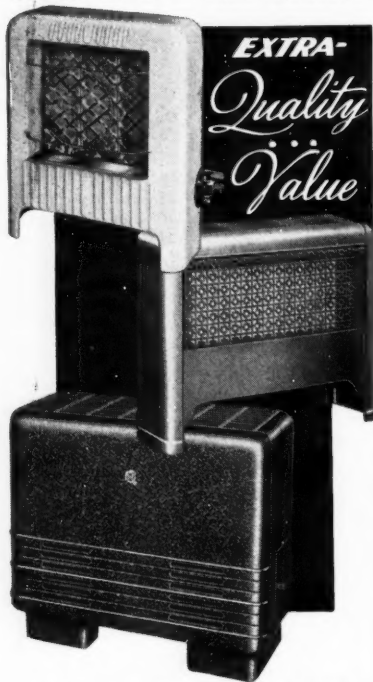
3250 HELCO Model 100A L.P.G. Regulators, Inlet P.O.L., Outlet $\frac{3}{4}$ ", Capacity 500 cu. ft. per hour, UL approved. Price \$2.50 each, lots of 100—\$2.00 each.

18 Chastek Motor Fuel Tanks (For Motor Transports) size 55" x 20", U69, complete with gauges, priced \$40.00 each, lots of 5—\$35.00 each.

*Terms Cash, F.O.B. City, Warehouse, Arkansas City, Kansas
Write, phone or wire*

Home National Bank, Arkansas City, Kansas

Peerless Circulators ★ Gas Heaters



64 years of Peerless research in the Science of Heating and its allied problems of Engineering, Design, Styling and Finish has resulted in today's outstanding quality heating equipment.

★ Made to Sell ★ Made to Last
★ Made to Satisfy

Peerless
MANUFACTURING CORPORATION
LOUISVILLE, KENTUCKY

he had been executive vice president of Dearborn Stove Company, Dallas, where he was largely responsible both for the operation of the plant and its merchandising program.

Mr. Wyatt will direct the expanded sales and advertising program planned for the Texas area, according to Mr. Dunn. A newly designed series of gas heaters is planned for the 1949 line.



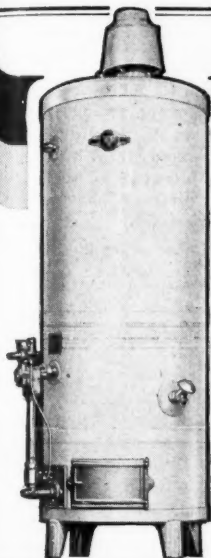
M. S. NICHOLSON

The Empire Stove Co. of Belleville, Illinois, manufacturers of gas heating and cooking appliances and the "Thriftmatic" gas burner, has opened a regional office at 1842 Bissonett St., Houston 5, Texas.

Lee A. Brand, Empire vice president, has announced the appointment of M. S. Nicholson as manager of the Houston office. Mr. Nicholson, a native Texan, has been associated with several large corporations in executive capacities, and is well-known in the area under his management.

The purchase of physical assets, patents and trade marks of Heating Research Corp., Anderson, Ind., by Stewart-Warner Corp., Chicago, is announced by James S. Knowlson, Stewart-Warner president and board chairman.

Heating Research Corp., headed by Allan W. Lundstrum, produces the "Saf-Aire" gas heater, a convection type space heater which burns manufactured, natural or bottled gas, Mr. Knowlson says. Mr. Lundstrum, in-



Outstanding Quality...Styling...Value

Greater grows the demand for SECURITY Automatic Hot Water Heaters. More and more buyers seek the smart appearance, dependable performance, superior workmanship for which SECURITY is famed. Thousands of users are amazed at the efficiency, economy and long life of these gleaming Automatic Water Heaters. Operate on all fuel gases. Now is the time to look to SECURITY . . . for leadership and for sales!

SECURITY

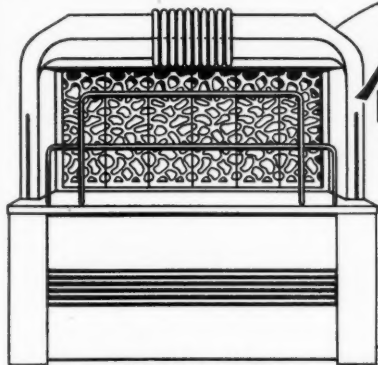
GAS FIRED



PRODUCTS

The "LONG-LIFE" LINE

SECURITY MANUFACTURING CO.
KANSAS CITY 3, MO.



MODEL No. 666

A New RADIANT MODEL



A distinctively modern creation in Featherweb Ivory and chrome. Deep recessed backwall directs maximum heat rays. High efficiency burner, non-clog ports, dial type regulator are features. A 24,000 b.t.u. heat-maker measuring 22" wide (20" at back) 10" deep and 20" high.

For All Gases



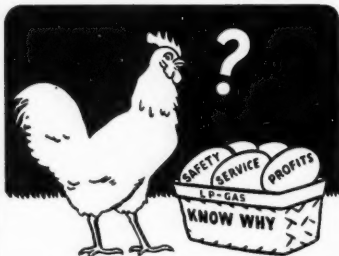
THE OHIO FOUNDRY & MANUFACTURING CO.

Engineers • Manufacturers • Designers

STEUBENVILLE • OHIO • U.S.A.

ESTABLISHED 1846

IT SOMETIMES PAYS



To Have All Your "Eggs" in One Basket

Particularly, when the "eggs" represent the solution of the problems of

Improved Service
Increased Safety
Assured Profits

When "KNOW-WHY" is combined with "KNOW-HOW" to insure these vital essentials to successful LP-Gas distribution operations.

PROTECT THESE "EGGS"

We have helped many and can help you, at a minimum of time and expense. Detach coupon below and mail to us, NOW!

NATIONAL L-P GAS INSTITUTE
1105 S. Main. TULSA, OKLA.

Please send full information concerning:
☐ 30-day Resident Course ☐ 4-months Resident Course ☐ Home Study Course. Men available for ☐ Installation ☐ Service ☐ Sales, or ☐ Combination of above three.

Name

Firm

Address

City..... State.....

NATIONAL L-P GAS INSTITUTE
1105 S. Main, TULSA, OKLA. Tel. 3-5076

ventor of the device, H. W. Milner, sales head of Heating Research, and other key personnel have joined the Stewart-Warner organization.

Production, marketing and other operations of the newly acquired business will be integrated with the "South Wind" division of Stewart-Warner at Indianapolis.

Distribution of a booklet presenting the history of the city of Utica, N. Y., is being made by Brunner Manufacturing Co., maker of LP-Gas tank unloading compressors in that city. The 11-page booklet is illustrated with interesting line drawings showing the development of the Mohawk Valley, in which Utica lies.

The presentation differs from the usual publicity in that it is concerned almost none at all with production figures and competitive arguments. Instead it tells at length the interesting history back of the town that was born shortly after the Revolutionary War days on the site of old Fort Schuyler and took its name from the ancient Phoenician city in a trend of the day toward classical names for American towns.

The Brunner company is proud of its town and wants its friends to know some of the reasons.

Grand Industries, Inc., Cleveland, is the new name of the Cleveland Co-operative Stove Co., according to recent announcement.

There will be no change in the method of operation of the divisions of the company which will continue under the trade names of Cleveland Foundry Co., Cleveland Distributing Co. and Grand Home Appliance Co. The vitreous enameling division will operate under the name Grand Enameling Co.



Season's Greetings

Our Quality L-P Gas Equipment will keep your customers in joyous spirits all year long!

REGO
L-P GAS EQUIPMENT

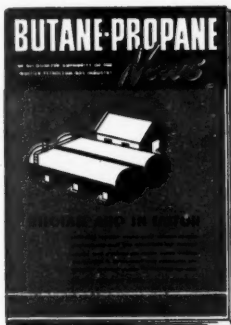
BRUNNER
TANK UNLOADING
UNITS

Aeroquip
HYDRAULIC HOSE

I.C.C. CYLINDERS

GAS EQUIPMENT COMPANY, Inc.

P. O. BOX 566
2620 South Ervay « DALLAS, TEXAS



CLIP THIS AND MAIL TODAY

if you are not a subscriber to

BUTANE-PROPANE NEWS

198 S. Alvarado St., Los Angeles 4, Calif.

SUBSCRIPTION ORDER

Enter my subscription to BUTANE-PROPANE NEWS to begin with the next issue.

- ☐ 1 year \$2.00 ☐ Check enclosed
☐ 2 years \$3.50
☐ 3 years \$5.00 ☐ Please bill me

In the U. S. Only

One Year Via Airmail \$8

Standard Rates Apply to U. S. & Possessions, Canada, Mexico, Cuba, South and Central American Countries.

All others.....1 year \$3.00 ☐

NAME _____ POSITION _____

COMPANY _____

STREET

CITY

ZONE

STATE

DECEMBER — 1948

169

Liquefied Petroleum Gas

Cities Service Oil Co.

•

A DEPENDABLE SOURCE
UNIFORM PRODUCTS
A CAPABLE SUPPLIER
TWENTY YEARS' EXPERIENCE

•

IN LP GAS ALSO

CITIES SERVICE
MEANS
GOOD SERVICE

•

CITIES SERVICE OIL CO. (Del.)

•

BARTLESVILLE, OKLA.
CHICAGO, ILL.

Other Sales Offices

Cleveland
St. Paul

Kansas City
Toronto



NORMAN RICE



J. P. PISTORIUS

The appointment of Norman D. Rice as branch manager of the Inland Steel Container Co. New Orleans plant, has been announced by John T. Gossett, vice president and general manager of the company.

In his new assignment, Mr. Rice will be in charge of all operations of the New Orleans plant. Main offices and plant are in Chicago and the company also operates a plant in Jersey City, N. J.

Joseph R. Pistorius has been appointed manager of sales of the heater division of the Inland Steel Container Co. at New Orleans, La., according to an announcement by Gordon D. Zuck, general manager of sales.

The Inland Steel Container Co. at its New Orleans plant manufactures the "Comforteer" line of gas space heaters.

The Bell Aircraft Corp., of Niagara Falls, N. Y., has purchased the entire capital stock of The W. J. Schoenberger Co. This action was in accordance with the policy of Bell Aircraft to diversify its activities and occurred last Sept. 15.

The new ownership will not change the products manufactured or personnel of the W. J. Schoenberger Co.,

RAPID MOISTURE REMOVERS

Now **UL** *approved!*

• Hydrostatic pressure tested for leakage and part failure, Rapid Moisture Removers were found to conform fully to Underwriters' Laboratories standards for design, construction and performance. Rapid Moisture Removers eliminate moisture freeze-ups. Install now for year-round constant gas service!



- Approved
- Safe to use
- Easy to install
- Equipped with standard LH-P. O. L. fittings
- Available in a variety of sizes
- Refillable—can be used indefinitely
- Protects regulator from scale and dirt



YOUR WHOLESALER CAN SUPPLY YOU

Fine PRODUCTS CO.

185 NORTH WABASH AVENUE • CHICAGO 1, ILLINOIS



... are described on pages 96 and 97—turn to them for all the facts!

Western Gas Equipment Co.

Office and Warehouse
202 N. GARFIELD, P. O. Box A MONTEREY PARK, CALIF.
Phone Cumberland 3-2239

exclusive
factory
distributor

REGO
LP GAS EQUIPMENT

In

ARIZONA

CALIFORNIA

IDAHO

NEW MEXICO

NEVADA

OREGON

UTAH

WASHINGTON



**For SALES
and SERVICE**
on your
VIKING
ROTARY PUMPS
call your nearest
VIKING
Representative

The Viking Pump Company is represented by a nation-wide sales and service organization in key cities from coast to coast... from Canada to the Gulf. Is your pumping installation operating at high efficiency? Do you have a pump maintenance problem? Do you have a new pumping application? Write or call the Viking representative nearest your plant for service.

CHICAGO 6
C. W. Dennis
549 W. Washington Bldg.
Phone State 2-4419

CLEVELAND 13
J. A. Sindes
310 Marshall Bldg.
Phone Cherry 0687

INDIANAPOLIS 4
C. D. Seidler
227 Freeman Building
Phone Lincoln 4788

KANSAS CITY 8
F. J. Plancy
1827 Grand Avenue
Phone Harrison 8033

MILWAUKEE 3
C. F. Mullens
410 West Michigan Street
Phone Daily 8-0807

NEW YORK 18
Hubert Faler
634 W. Forty-fourth St.
Phone Longacre 3-3818

BALTIMORE 1
Wallace Stebbins Co.
Charles and Lombard Sts.

BIRMINGHAM
Pump Shop, Inc.
1015 Seventh Ave. So.

BOISE
The Olson Mfg. Co.
P. O. Box 1487

BOSTON 10
Hayes Pump & Machinery Co.
125 Purchase St.

BUFFALO 10
Root, Neal & Company
44 Peabody St.

CHARLOTTE, N. C.
Southern Pump & Tank Co.
1730 N. Tryon St.

DENVER
Hendrick-Balthoff Co.
1635 Seventeenth St.

DENVER
Eaton Metal Products Co.
4800 York Street
Also Albuquerque, Casper,
Billings and Omaha

DETROIT 26
Kerr Machinery Co.
Kerr Building
EVANSVILLE, IND.

EVANSVILLE, IND.
Shover Machinery Co.
222 Court Bldg.

HOUSTON 1
Southern Engineering & Pump Co.
900 St. Charles St.
Also Dallas, San Antonio,
Edinburg and El Paso

LOS ANGELES 11
E. E. Burton
4432 Long Beach Avenue

LOUISVILLE 2
Hull LaVie Supply Co.
505 W. Main Street

MEMPHIS 2
J. E. Dillworth Co.
347 South Front Street

MINNEAPOLIS 14
Loren C. Gifford
2524 University Ave. S. E.

NEW ORLEANS 12
Messer Pump & Machinery Co.
547 Dryades Street

PHILADELPHIA 10
Walter H. Egan Co.
2336-38 Furment Ave.

PITTSBURGH 22
Power & Equipment Co.
Oliver Building

RICHMOND
O'Neill Pump & Engineering Co.
401 East Franklin St.

RICHMOND
Richmond Engineering Co.
Seventh and Hospital Sts.

SAN FRANCISCO 19
Debra Pacific Co.
61 Brule St.

SEATTLE AND PORTLAND
ST. LOUIS 1
Egan Machinery Co.
Seventh and Market Sts.

TULSA 8
Warner Lewis Co.
617 North Lewis Place

which will operate as a separate, integrated unit in Cleveland, Ohio.

The efforts of this company will be devoted exclusively to the development and manufacture of valves, fittings and accessories for the gas appliance industry.

Romus T. Bergh, division manager of the Geo. D. Roper Corp., died in Kansas City, Mo., on Sept. 25. A well-known figure in the gas appliance business, Mr. Bergh was 62 years old at the time of his death.

Joining the Geo. D. Roper Corp. on Nov. 1, 1929, he progressed rapidly in the organization. In his capacity as division manager, he supervised Roper activity in the Missouri, Kansas, Oklahoma, Iowa, Nebraska and Arkansas territory.

Martha Carnes, former assistant home economics director for Servel has been appointed director of home economics for Servel's Homemaker's Institute.

The announcement was made by R. J. Canniff, advertising and sales promotion manager of Servel. Miss Carnes, who joined Servel in 1946, is a former dietician of the Welborn Memorial Hospital in Evansville. She is a graduate of Purdue University and a native of Evansville.

Those who are interested in the success of the Norge division of the Borg-Warner Corp. may send for a copy of a booklet recently issued entitled "The Story of Norge."

Featuring the vision and spirit of Howard E. Blood, president, this booklet tells the story of the company's development since its origin in 1926. Of prime interest to LP-Gas dealers will be references to the Norge gas range which is included in this book.



VIKING
PUMP COMPANY
Cedar Falls, Iowa

JOHNSON

LP-GAS BURNING EQUIPMENT

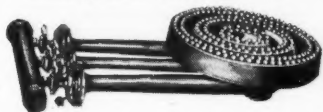
Every Industrial User a Live Prospect

• Hand torches — Bench soldering
furnaces — Ring burners — Urn burn-
ers — Drilled pipe burners — Bun-
sen burners of all types.

***When you sell Johnson—
You sell the Best***

Write for Catalog and Details

Atmospheric King Burners



Made up of independently controlled
ring burners which can be used single, in
pairs, or in triple. Write for complete
specifications.

JOHNSON GAS APPLIANCE CO. (Since 1901)
597 E AVENUE N.W., CEDAR RAPIDS, IOWA

Butane & Propane

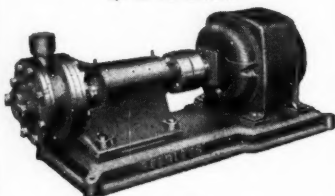
E

**Producers of high quality
Liquefied Petroleum Gases Since 1931
Wholesale Only**

THE CARTER OIL COMPANY
T U L S A , O K L A H O M A

For
Butane-Propane
SERVICE
PEERLESS
TURBINE (VANE)
PUMPS

For High Heads and Capacities
 up to 50 G.P.M.



Type XT

For efficient, low cost liquefied petroleum gas services including 1 p-g bottling, tank storage, truck, tankcar transfer, etc.

Most advanced in design and construction for maximum service and dependability.

Write for Details



Peerless Pump Div.

**FOOD MACHINERY AND
 CHEMICAL CORPORATION**

Los Angeles 31, Calif.
 Indianapolis, Ind.

Bagwell-General Steel Co. Enters LP-Gas Field

A new steel tank fabricator known as the Bagwell-General Steel Co., Inc., (an Oklahoma corporation) has begun operation at Sapulpa, Okla. This new company has purchased all the manufacturing facilities and a majority of the equipment, with the exception of appliances, of the Southern Gas and Equipment Co. Bagwell-General will continue to use the Southern Gas and Equipment Co. trademark "Southern Systems" and are making available a complete line of butane-propane systems—propane truck tanks, propane transports, LP-Gas storage tanks, skid tanks, pumps, hose, and all other types of API-ASME pressure vessels.

The Bagwell-General Steel Co., Inc., is affiliated with the General Steel Tank Co., Inc., of Birmingham, Ala., and the Bagwell Steel Co., Inc., of Bessemer, Ala. The officers of the new corporation are as follows: M. W. "Mike" Bagwell, president; S. W. "Bill" Green, vice president, and Ralph Hicks, secretary.

LPGA Committee Suggests Changes in Pamphlet 58

At the October meeting of the board of directors of the LPGA, the Technical and Standards committee submitted a recommendation for minimum of Type 200 tanks for approval of the board and in turn for recommendation to the National Fire Protection Assn. for inclusion in the next revision of NBFU Pamphlet No. 58.

The recommendation provides for the "approval for not less than Type 200 tanks in Division 2, 3, and 4 of NBFU Pamphlet No. 58, except that containers covered by Division 3 may be designed for other types as now covered by Pamphlet 58 when trucks

DE LARCO

Presents Your

L-P "WORKHORSE"

1250 water gallon, 200 P.S.I. propane truck tank. Available from stock.

- **Built for Performance**
- **Built for Safety**
- **Built for Service**

"ASK THE MAN WHO DRIVES ONE"

INQUIRIES INVITED

Frank P. DeLarzelere Company

P. O. Box 1684

Tulsa, Okla.

Phone 4-0150

"The Industry's Fastest Growing Service Institution"

*Merry
Christmas*

And a Prosperous
New Year.....

Quality L-P Gas Equipment

is your best
prosperity insurance!



I.C.C. CYLINDERS



GAS EQUIPMENT SUPPLY CO.

127 ELLIS ST. N. E.

ATLANTA, GA.

L-P GAS MEN KNOW it's
RECTORSEAL # 2
 for "LEAK PROOF" CONNECTIONS



RECTORSEAL #2 has a plastic elasticity that remains for the life of the connection. It never hardens . . . never freezes connections. It's not affected by Butane or Propane (liquid or gaseous). It's the favorite for "Leak-Proofing the LP-Gas Industry."

LP-Gas Men know that permanently leak-proof connections are essential . . . save trouble . . . save money . . . prevent danger . . . make every connection safer. They like the new easy-to-use Rectorseal "Brush-Top" cans that assure using just the right amount of seal to prevent waste, as well as trouble. Ask your dealer or jobber for Rectorseal #2 in the size you need. If he hasn't yet stocked it, write us direct, giving his name and address. (Available in pints, 12 to case; half pints, 24 to case; quarter pints, 24 to case).

Write: RECTORSEAL Dept. A,
 2215 Commerce St., Houston 2, Texas

RECTORSEAL # 2

Patented Trade Mark Reg. U.S. Pat. Off.

MAKING THE L-P GAS INDUSTRY SAFER

are filled exclusively at point of LP-Gas production." (Refineries and natural gasoline plants are automatically excluded. See Pamphlet 58 Application of Rules.)

The recommendation of the Technical and Standards committee was scheduled to be considered at the November meeting of the LPGA directors in Chicago.

Lawrence Parlett Dies With Heart Attack

Lawrence L. Parlett, 45, owner of the Parlett Gas Service at Waldorf, Md., died of a heart attack Oct. 20 at his home, Cellar Hill, at Mechanicsville, Md.

The firm that he owned and operated distributes bottled gas through Maryland and Virginia. He also owned the Patuxent View Farms at Mechanicsville.

ON HAND— FOR IMMEDIATE SHIPMENT

Dished and Flanged Heads for Pressure Vessels

112 Lukens 46" O.D. A.S.M.E. Code Type, 25/32" Nom. 55,000 Flange Quality Steel 2" Flange, \$42.50 each F.O.B. Omaha. Can Furnish Test Reports.

Saddles with Manholes

44 Lukens 5/8" Firebox Plate Saddles with 12 x 16 Manhole (Type B) Banded as per Style A for 46" O.D. Tank. Complete with Fittings and Gaskets. \$35.40 each F.O.B. Omaha. Can Furnish Test Reports.

DONALD W. SPARKS

P.O. Box 1235

OMAHA, NEBRASKA

MISCELLANEOUS—Continued

read 530 Btu equivalent from 2550 propane vapor. Still in original carton. Consumers Utilities Co., Winchester, Virginia.

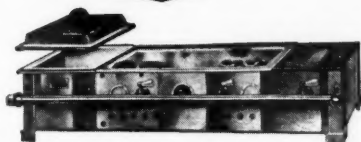
REGO REGULATORS No. 2403-A9 \$3.17 each, any quantity. Complete outfits 4715AY \$5.95. 100 lb. propane cylinders, without valves, ICC-4B-240, tare weight 95 lbs., in stock, while they last \$20.45 FOB Home Gas Equipment Company, 1836 East 23rd Street, Cleveland 14, Ohio.

FOR SALE—2-TON MILWAUKEE HY-draulic hoist mounted on 1946 Chevrolet 1½ ton truck with 1/3 yard Clam bucket. Also 8x14 ft. flat steel bed trailer, if desired. Good condition. Ideal for installing tanks. Price reasonable on request. Butane Gas & Appliance Co., 9000 Watson Rd., St. Louis Co. 19, Missouri.

SPRAGUE METERS USED, NO. 0 AND 1A. For LP-Gas, cubic foot reading. Good condition. Right price. Butane Gas & Appliance Co., 9000 Watson Rd., St. Louis Co. 19, Missouri.

PROFESSIONAL SERVICES

BUILDING A BULK PLANT? LET US serve you as we have so many others. H. Emerson Thomas & Associates, Westfield, N. J. Telephone 2-2800.



MEXIHOT BARBECUE MACHINE

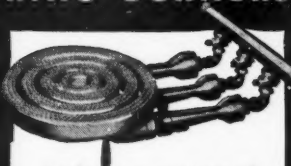
Thousands of installations in drug stores, tap rooms, roadside stands, cafes and other places that serve lunches have brought big repeat business. Low price means quick sale. Write for distributorship at once.

Copyright 1947

Department B12

DICKERSON MANUFACTURING CO.
Springfield, Missouri

BRYANT ATMOSPHERIC RING BURNERS



Made in a variety of
sizes and special shapes
for all types of vertical
open firing.

SINGLE OR MULTIPLE RINGS

BRYANT HEATER COMPANY

INDUSTRIAL DIVISION

1020 LONDON RD. • CLEVELAND, OHIO



PROMPT
DELIVERY
OF
TANKS
ICC
ASME
API

Check These Features

- Machine Welded. • Replaceable 10%.
- Sand Blasted Before Painting

**Manchester Welding
and Fabricating Co.**

2880 Norton Ave.,—NE. 6-2839—Lynwood, Cal.

BUTANE-PROPANE News

Index to Volume X

January Through December, 1948

Jenkins Publications, Inc., Publisher

198 South Alvarado St., Los Angeles 4, California

A	Authors—Continued	Page
Accounting		
ABC's of Good Credit Risks, by Plasco G. MooreSept.	Brogan, Daniel J., Commercial Cooking With LP-Gas: A Modern Con- ceptAug.	75 137
Records That Pay Off, by J. M. LaniganOct.	Buehler, Herbert A., How Codes Govern Tank ConstructionApril	71 59
Seeing Your Business Through Business Records, by Marshall Massey....Apr.	Butterworth, A. C., Butane-Powered Trucks Excel Diesels in Minnesota Iron Ore Hauling.....Oct.	103 126
Agricultural Uses	Christopherson, W. R., Short Pause for MeditationApril	41
Anhydrous Ammonia: Engineering As- pects of Its Appliance in Agriculture, by L. M. Roberts.....Aug.	Clevenger, Keith, Home Study Course on LP-Gas Now Available to GI'sJan.	176 76
Fruit Drying Operation with LP-Gas Increases Output 30%.....Feb.	Clevenger, Keith, Make Safe Installa- tions to Lower Service Costs and In- crease ProfitsAug.	130 50
What Anhydrous Ammonia Demand Means to Butane-Propane Industry, by Bob Farson.....Feb.	Condee, Verlin E., "People Are Gas- Hungry"Dec.	79 51
AGA Testing Laboratories	Cooper, Kenneth, New "Shangri-La" of the West Goes LP-Gas.....Oct.	59
AGA Laboratories 1947 Report Shows 50% Increase of Tests.....Jan.	Coover, T. W., How to Improve Sales TechniqueFeb.	182 182
AGA Laboratories Propose Standard ChangesJan.	Crooks, S. B., New Production Facilities Will Increase Supply.....July	59 86
Appliances	Davies, E. D., Care in Design Gives Bulk Plant Outstanding Safety Fea- turesApril	43
Can Now Build LP-Gas Ranges to "CP" SpecificationsJune	Denton, C. M., How to Figure Pumping CostsJan.	266 140
Gas Range Sales Reach New Six Months' PeakOct.	Dudley, C. C., Burner Adjustment, Sept. Dudley, C. C., Burner Adjustment, Part 2Dec.	51 82
Authors	Ellis, S. W., Repair Service: When It's Good It Beats Competition.....April	64
Ambrose, Z. C., More Propane—Less MoneySept.	Ellis, S. W., Sell the Woman to Sell the DealJan.	107 113
Bell, Stanley, Positive Lock-Off Reg- ulatorsDec.	Farson, Bob, LPGA Board Approves Committees for Sacramento Con- ventionJan.	132 134
Bonn, H. L., Selling LP-Gas in Eng- landMar.	Farson, Bob, Safety-Service Training SchoolsOct.	68 99
Bolander, George, Underground Tanks: Installation Methods and Moisture Problems. Part 1.....Sept.	Farson, Bob, What Anhydrous Ammo- nia Demand Means to Butane-Propa- ne IndustryFeb.	190 79
Bolander, George, Underground Tanks: Installation Methods and Moisture Problems. Part 2.....Oct.	Fetherston, Franklin R., Safety.....June	116 71
Boynton, W. W., The Fuel Outlook in the EastJan.	Freedman, Ray, Cyr Bottled Gas Co.	84
Breting, D. L., Checking Equipment to Make a Safer Industry.....Dec.		
Brightwell, Emmett, Fusing Plastics With ButaneApr.		122

Authors—Continued	Page
Installs 30,000-Gal. Gas Storage Tank	150
Garretson, O. L., Uncertainties of Future Supply	70
Gerke, H. E., Working for Greater Safety	61
Glanzer, Phil, See Future for LP-Gas in Canadian Markets	172
Graham, J. L., Testing Cylinders in LP-Gas Service	117
Hachmuth, K. H., Improving Light Ends Recovery	107
Hagler, W. C., Delivering 30,000 Gal. Tank to Durango, Colo., by Narrow Gauge Proves Engineering Feat.	67
Hall, O. D., "Brighter Days Ahead," Promised Oklahoma Dealers at Convention	129
Hall, O. D., Drying Pennuts with LP-Gas Saves Losses, Speeds Deliveries	94
Hall, O. D., Good Merchandising Methods Win	68
Hall, O. D., Large Storage Gas Systems Bring Consumer Satisfaction	50
Hall, O. D., Novel Field School Teaches Way to Make Fast Transfers	74
Hall, O. D., Students Get Close to Industry Problems at School	65
Hall, O. D., Truck Driver's "Clinic" Shows How Easy It is to be Safe	102
Hannau, Walter, Bulk Plant Safety Recommendations	88
Havens, F. N., Four Essentials for Profit	61
Havens, F. N., Good Truck Drivers Build Good Business	176
Hedlund, Si, Increasing the Safety Factor in Truck Tank Design	66
Holzappel, G. L., Butane as a Motor Fuel	148
Hubel, John E., Propane-Air Plant Successful in Old Manufactured Gas Town	107
Jamison, E. A., Butane and Propane as Tractor Fuels	144
Johnson, Zoe, Arkansas Dealers Hold Their Biggest Convention	117
Johnson, Zoe, "Competitors May Be Gentlemen"	154
Johnson, Zoe, Dealer Finds Success in Own Backyard	168
Johnson, Zoe, Two GI's Apply War Experience to Building a Butane Business	60
Johnston, J. W., Liquid Meters	118
Kintz, G. M., Study Fuel Characteristics to Be Safe	89
Knudsen, Edward T., Pacific Coast Sales Up 24% in '47	55
Kreutzer, Arthur C., Butane-Propane Legislation	63
Kreutzer, Arthur C., Case Against Public Utility Control	85
Kutnewakey, Fremont, New Mexico Association Elects Officers	138

Authors—Continued	Page
Lady, Paul, Portland Firm's Distribution Makes Northwest States Gas Conscious	68
Lady, Paul, Speakers Hand Out Straight Talk at Texas Butane Convention	110
Lanigan, J. M., Records that Pay Off	71
Lawren, Joseph, Country Living Deluxe	76
Legatski, T. W., Available Gas Supply Six Times Present Demand	58
Machen, Roy W., Hydrocarbons—What Are They?	174
Massey, Marshall, Seeing Your Business Through Business Records	103
Massey, Maydell, It's the Woman Who Buys	79
Mattocks, E. O., Use of Unfired Pressure Vessels in LP-Gas Industry, Part 1	43
Mattocks, E. O., Use of Unfired Pressure Vessels in LP-Gas Industry, Part 2	61
Mattocks, E. O., Use of Unfired Pressure Vessels in LP-Gas Industry, Part 3	100
Mattocks, E. O., Use of Unfired Pressure Vessels in LP-Gas Industry, Part 4	78
McCullough, G. W., Improving Light Ends Recovery	107
McCurdy, Dave, What Time is It?	39
McKinley, J. L., Traveling Demonstration Trailer	50
Miller, A. J., Improving Light Ends Recovery	107
Moore, Plasco G. ABC's of Good Credit Risks	75
Murray, William J. Jr., Fuel for Next Winter	58
Mylander, Roy, Safe Practices in Motor Fuel Use	146
Niederhoff, A. E., Naval Ordnance Test Station on Desert Uses LP-Gas in Laboratories and Homes	47
Ransome, Tallent H., "Gold Is Where You Find It"	61
Roberts, L. M., Anhydrous Ammonia: Engineering Aspects of Its Application in Agriculture	176
Robinson, John M., "Organize and Prosper"	59
Rugh, K. W., Do You Want an Employee Safety Program?	108
Rugh, K. W., LP-Gas Sales Gain 30% in 1947	41
Runkle, Lowe, "Advertising Package" Ready for Dealers	81
Schuette, W. A., Distributor Holds Service School for Employes and Dealers	72
Smith, Bob, Butane-Fueled Engines Power Electric Generating Plants	144
Smith, Bob, LP-Gas Expands in Texas	57
Smith, Bob, What Trailerites Should Do to Play Safe	54

Authors—Continued Page

Smith, F. F., Trailer Coach Standards Sought by Manufacturers and Industry	July	122
Smith, Lawrence W., Resistance-to-Flow in the LP-Gas Pump Discharge Line	Nov.	55
Somerton, W. H., Butane-Propane: A Look at Past, Present and Future	Feb.	108
Spooner, Harry L., Service at a Loss May Become Profit in Long Run to Dealer	June	258
Spooner, Harry L., Thirteen Ways to Win Customers	Oct.	47
Stratman, Edward A., Butane-Propane Carburetion: A Simple Explanation of the Use of LP-Gas in Internal Combustion Engines	Aug.	128
Strother, J. R., Butane and Propane as Tractor Fuels	Sept.	144
Thoes, Dewey, Transfer of LP-Gases	Sept.	168
Thomas, H. Emerson, Cooperation Keeps Gas in Front	April	73
Thomas, R. W., LP-Gas Sales Gain 30% in 1947	Jan.	41
Titus, Ed, Building a Dealer Organization, Part 3	Jan.	92
Titus, Ed, Cook 9900 Meals Daily on Propane Commercial Equipment	Oct.	55
Titus, Ed, Distributing LP-Gas in Denmark	July	39
Titus, Ed, Laying Copper Mains for a Town Plant in Virginia	Sept.	61
Titus, Ed, LP-Gas Men and Equipment Help Battle Maine Forest Fires	Jan.	55
Titus, Ed, New England Firm Specializes in Domestic Customers Only	Mar.	83
Titus, Ed, Putting 30,000 Customers on the Books	May	84
Titus, Ed, Standby Facilities Permit Utility to Serve Fringe Areas with LP-Gas	Feb.	64
Titus, Ed, Standby and Conversion to Propane Mark Expansion in East	Mar.	63
Titus, Ed, Steel Shortage, Dollar Surplus, Explained to Eastern Gas Men	Nov.	116
Titus, Ed, Streamlining a Bulk Plant	Dec.	63
Toles, George E., Western Electric Uses Propane to Avoid Costly Shutdown	Mar.	82
Warren, Minnette Lake, Steal Customers? You'll Lose If You Do	Aug.	52
Wickstrom, Harold W., The Chiseler	July	158
Wilson, Avon, Montanans Play Host to "International Convention"	Jan.	120
Winfree, R. E., Builds Gas Load on Commercial Installations	Aug.	47

Automotive (See Power)

B

Bulk Plant—Filling Plants		Page
Bupane Gas Co., of Iowa Installs Plant in Illinois	April	98
Care in Design Gives Bulk Plant Outstanding Safety Features, by E. D. Davies	April	43
Cyr Bottled Gas Co. Installs 30,000 Gal. Gas Storage Tank, by Ray Freedman	Feb.	150
New Iowa Falls Bulk Plant Reaches Completion	Mar.	152
Producer Installing Huge LP-Gas Storage	Sept.	74
Small, Mobile Storage Unit Starts Dealer in Business	May	121
Two 30,000-Gal. Propane Tanks Installed at Tulsa for Skelgas	May	160

C

Central and Standby Plants		Page
Another Florida Town Replaces Manufactured Gas	Mar.	67
Binghamton, N. Y., Gas Works Completes Standby Facilities	Jan.	176
Central Plants: Safe Design and Operation	Sept.	85
Franchise Granted for Town Plant in Tijuana, Mexico	Oct.	140
General Motor Division Wants to Install Standby	July	85
Kerrville Butane-Air Plant Sold to Lone Star Gas Co.	Sept.	99
Laying Copper Mains for a Town Plant in Virginia, by Ed Titus	Sept.	61
Propane-Air Plant Successful in Old Manufactured Gas Town, by John E. Hubel	Feb.	107
Propane, Emergency Substitute, Permanently Replaces Manufactured Gas	Nov.	51
Redding, Calif., Changes Over to Propane-Air Town Plant	Feb.	152
Six More Utility Plants Install Propane Standbys	Jan.	182
Standby and Conversion to Propane Mark Expansion in East, by Ed Titus	Mar.	63

Codes (See Regulations)

Commercial Installations		Page
Builds Gas Load on Commercial Installation, by R. E. Winfree	Aug.	47
Commercial Cooking with LP-Gas: A Modern Concept, by Daniel J. Brogan	Aug.	137
Cook 9900 Meals Daily on Propane Commercial Equipment, by Ed Titus	Oct.	55
Drying Peanuts with LP-Gas Saves Losses, Speeds Deliveries, by O. D. Hall	April	94
Fusing Plastics with Butane, by Emmett Brightwell	April	122
Illinois Plant Sings Hogs with Butane-Propane Gas	Aug.	140
Small Gas Plants Open Field for Industrial Users	Jan.	110
Thinks LP-Gas OK After 25-Year Test	April	100

E	Page
Education	
Home Study Course on LP-Gas Now Available to GI's, by Keith Clevenger	Jan. 76
Nobody Skipped School Here!.....Nov.	94
Pittsburgh School Draws Big Crowd.....Oct.	112
Pittsburgh, University of, Short Course Will Aid Industry.....Aug.	101
Sales and Safety Schools Will Aid Oklahoma Dealers	June 236

F

Fire Prevention

(See Safety, Codes, Regulations)

Foreign Distribution

Bottle Filling Plant Shipped to Fortaleza, Brazil	Feb. 102
Distributing LP-Gas Abroad.....Aug.	154
Distributing LP-Gas in Denmark, by Ed Titus	July 39
LP-Gas Heads South.....Feb.	70
Selling Bottled Gas in Brazil....Jan.	48
Selling LP-Gas in England, by H. L. Benn	Mar. 68
Standard Oil Co. (New Jersey) Purchases 11 More Tankers.....Jan.	180

G

Guest Editorials

"Gold Is Where You Find It," by Tallent H. Ransome	May 61
Organize and Prosper, by John M. Robinson	Sept. 59
Safety, by Franklin R. Fetherston	June 71
Short Pause for Meditation, by W. R. Christopherson	April 41
What Time Is It?, by Dave McCurdy	Jan. 39
Working for Greater Safety, by H. E. Gerke	Mar. 61

I

Insurance (See Safety)

Insurance Basic Rate Increase of 3% Approved for California	Mar. 184
Texas Dealers Organizing State Wide Insurance Plan	May 118

Internal Combustion Engines (See Power)

L

Liquefied Petroleum Gas Assns. and Districts Chicago Set for 1949 LPG Convention	Nov. 98
Consumers Will See Equipment In Action at LPG June Show	Mar. 77
Koach, Kenneth, Named President of LPG at Annual Convention	July 59
LPG Plans Five Regional Instruction Short Courses	May 130

LPGA and Districts

Page

LPGA Board Approves Committees For Sacramento Convention, by Bob Farson	Jan. 134
LPGA Will Confer Honor Upon Contributors to LP-Gas	Jan. 88
LP-Gases on Dress Parade	May 73
More Committee Chairmen Named by LPGA President	Nov. 114
New LPGA President Appoints Committees	Sept. 128
Pacific Oil Strike Prompts Dealer Meetings by LPGA	Nov. 141
Sacramento or Bust	Apr. 88
Southern States Hold Mid-Winter LPGA Convention in New Orleans	Jan. 133
Steel Shortage, Dollar Surplus, Explained to Eastern Gas Men, by Ed Titus	Nov. 116
Two LPGA Districts Will Meet October 7 in Atlantic City	Sept. 128
Will Ask NBFU to Supplement Code Table With Curve	Jan. 178

M

Miscellaneous

Abstract of American Gas Association Domestic Gas Research Bulletin	Jan. 151
"As Long as There's Been an Industry" The 25-Year Club.....Dec.	106
Attendance Records Broken at Tulsa Oil Show	July 184
Building a Dealer Organization, Part 3, by Ed Titus	Jan. 92
Burner Adjustment, Part 1, by C. C. Dudley	Sept. 118
Burner Adjustment, Part 2, by C. C. Dudley	Dec. 82
Burrell, Col. Geo. A., Given Hanlon Award	May 104
Butane and Propane: A Look at the Past, Present, and Future, by W. H. Somerton	Feb. 108
Case Against Public Utility Control, by Arthur C. Kreutzer	Aug. 86
Cheap Coal, But Canadians Buy Propane At Premium Price	May 63
The Chiseler, by Harold W. Wickstrom	July 153
Convert 6000 Meters from Water Gas to Propane-Air	Dec. 78
Cooperation Keeps Gas in Front, by H. Emerson Thomas	Apr. 73
Country Living Deluxe, by Joseph Lawren	Feb. 76
Cylinder Valve Threads May Be Standardized	Apr. 170
Dealer Finds Success in Own Backyard, by Zoe Johnson	Feb. 168
Delivering 30,000 Gal. Tank to Durango, Colo., by Narrow Gauge Proves Engineering Feat, by W. C. Hagler	July 67
Famed Olympiad Torch Burned Butane	Oct. 53

Miscellaneous—Continued	Page
Farmers—Why Gamble?	Jan. 90
Fire Loss Report Shows Gas Far Below Electricity in 1946	May 125
Four Essentials for Profit, by F. N. Havens	Nov. 61
Fuel Requirements for Space Heating	Dec. 161
Gas Heater For Potato Cars Offers New Fuel Application	July 74
Good Truck Drivers Build Good Business, by F. N. Havens	July 176
Heating Comfort on a Mountain Top	Oct. 62
How Codes Govern Tank Construction, by Herbert A. Buehler	April 59
Hydrocarbons—What are They? by Roy W. Machen	Apr. 174
Increasing the Safety Factor in Truck Tank Design, by Si Hedlund	Dec. 66
Industry Gets Representation on National Petroleum Council	April 53
Industry Warned Against Use of Oxygen Tanks	Aug. 141
Large Storage Gas Systems Bring Consumer Satisfaction, by O. D. Hall	Jan. 50
Liquid Meters, by J. W. Johnston	Dec. 118
LP-Gas Expands in Texas, by Bob Smith	Feb. 57
LP-Gas For-Hire Carriers Total 23, Survey Shows	July 57
LP-Gas Men and Equipment Help Battle Maine Forest Fires, by Ed Titus	Jan. 55
Louisiana Users Promised Adequate Fuel Next Winter	Nov. 132
Magruder, Phil, Named Vice President by General Petroleum	Mar. 184
Make Safe Installations to Lower Service Costs and Increase Profits, by Keith Clevenger	Aug. 50
Minnesota Company Cuts Delivery Costs With Mobile Radio-Telephone Service	May 107
More Steel Means More Gas Saved	Oct. 182
Naval Ordnance Test Station on Desert Uses LP-Gas in Laboratories and Homes, by A. E. Niederhoff	Nov. 47
New England Firm Specializes in Domestic Customers Only, by Ed Titus	Mar. 83
N. J. Standard Changes Name to Esso Standard Oil Co.	Apr. 101
New "Shangri-La" of the West Goes LP-Gas, by Kenneth Cooper	Oct. 58
Oregon LP-Gas Men Given Examination by State	Sept. 156
"People Are Gas-Hungry," by Verlin E. Condee	Dec. 51
Portland Firm's Distribution Makes Northwest States Gas Conscious, by Paul Lady	May 68
Price Schedule For Testing Tanks	Feb. 178
Propane Powered Pants Presser Pampers Patrons	Apr. 121

Miscellaneous—Continued	Page
Putting 30,000 Customers on the Books, by Ed Titus	May 84
Rapid Thermogas Holds Meet for 200 Midwest Dealers	June 239
See Future for LP-Gas in Canadian Markets, by Phil Glanzer	Jan. 172
Service at a Loss May Become Profit in Long Run to Dealer, by Harry L. Spooner	June 258
Shell Starts Construction On California Chemical Plant	May 160
Standby Facilities Permit Utility To Serve Fringe Areas With LP-Gas, by Ed Titus	Feb. 64
Streamlining a Bulk Plant, by Ed Titus	Dec. 63
"Suburban Gas Service" Formed by New California Syndicate	June 298
Suppliers Reveal Conditions Governing Supply and Demand	Mar. 132
Testing Cylinders in LP-Gas Service, by J. L. Graham	Jan. 117
Transfer of LP-Gases, by Dewey Thoes	Sept. 168
Two GI's Apply War Experience to Building A Butane Business, by Zoe Johnson	Jan. 60
Two Midwest Firms Combine To Expand Operations	Jan. 178
Underground Tanks: Installation Methods and Moisture Problems, Part 1, by George Bolander	Sept. 190
Underground Tanks: Installation Methods and Moisture Problems, Part 2, by George Bolander	Oct. 116
Utah Firm Sells National Parks	July 63
UDI Distributors Convention Attracts 400 in Maine	July 100
Western Electric Uses Propane To Avoid Costly Shutdown, by George E. Toles	Mar. 82
What Trailerites Should Do To Play Safe, by Bob Smith	April 54
Winnipeg Company Flies Propane to Isolated Consumers	June 252

N

National Butane-Propane Association

NBPA Directors Lay Plans for 1948 Chicago Convention	Jan. 126
NBPA Directors to Meet in New Orleans	June 226
NBPA Elects John Locke President At Annual Convention	Nov. 79
NBPA Issues Compilation of All LP-Gas State Laws	Apr. 126
NBPA Lines Up Imposing List of Speakers For September Convention	Aug. 104
NBPA's Third National Convention Ready to Open in Chicago, Sept. 20	Sept. 126

Organizations—Continued

Page

(See LPGA and NBPA)

Alabama Association Announces Training School	July 111
Arkansas Dealers Hold Their Biggest Convention, by Zoe Johnson	Aug. 117
Bridge, A. F., Named President Pacific Coast Gas Assn.	Nov. 99
"Brighter Days Ahead," Promised Oklahoma Dealers at Convention, by O. D. Hall	Nov. 129
California Natural Gasoline Assn. Elects New Officers	Sept. 134
California Natural Gasoline Assn. Presents Annual Frolic, June 5.....	June 233
Canadian District Cooperates with Canadian Standards Association	June 227
Canadians Hold First Meeting As LPGA District No. 8	May 126
Colorado Dealers Discuss Industry Problems	Nov. 101
Colorado Dealers Plan Annual Convention for Denver	Sept. 133
Colorado Dealers Plan Safety Program	Jan. 127
Colorado Elects F. N. Mabree Association President	July 113
Colorado Group Holds Spring Meeting	June 229
Colorado Preparing for the February LP-Gas Short Course.....	Dec. 109
Council LP-Gas Associations Elects New Officers	June 226
Enthusiastic Pennsylvania Association Elects Roy Johnson President	Nov. 110
Fetherston Again Secretary Compressed Gas Association	Mar. 127
Florida Dealers Discuss Technical Problems	May 141
GAMA Holds Annual Meeting in Chicago	May 141
GAMA Invites LP-Gas Dealers to Exhibits	Aug. 105
Georgia Association Host to Alabama Dealers	May 136
Georgia Dealers Discuss Safety and Insurance Problems	July 104
Havens, F. N., Elected President, Kansas LPGA	Dec. 111
Hendee, Robert W., New President, American Gas Assn.	Nov. 98
Iowa Organization Hears State Fire Marshal on Safe Practices	Nov. 104
Kansas Association Adopts Advertising Program	Oct. 106
Kansas Association Stages LP-Gas Service School	Mar. 131
Kansans Hold Trade Exhibit	May 139
Kansas LPGA Holds Third Annual Convention and Trade Exhibit	June 230
Kansas LPGA Sponsors Service School in LP-Gas	Feb. 118
Kentucky Association Holds First Annual Convention	Nov. 104
Kentucky Association to Celebrate First	

Organizations—Continued

Page

Anniversary at Convention	Sept. 133
Louisiana Dealers Seek Larger Consumer Storage	Apr. 144
Louisiana Group Honors Moss for LP-Gas Services	Sept. 166
Louisiana Organization Summarizes State Tax Statutes	Oct. 106
Louisville Dealers Form Group to Promote Bottled Gas	Sept. 137
Michigan Association Plans Weights and Measures Procedure.....	Aug. 105
Michigan LP-Gas Men Present Gas School Every Month	Mar. 131
Minnesota LP-Gas Men Form Association	Nov. 107
Missourians Elect Monte Taylor to the Presidency	Nov. 108
Montanans Play Host to "International Convention," by Avon Wilson	Jan. 120
Montgomery, Howard, Heads NGAA Technical Committee	Nov. 74
Natural Gasoline Association of America	Jan. 126
NGAA Holds Southern Regional Meeting	Nov. 99
NGAA Meets in Texas	May 134
NGAA Speakers Give LP-Gas Front Seat at Annual Convention	July 107
Nebraska Dealers Attend Annual Convention	Dec. 112
New Jersey Assn. Discusses Progress of Industry	Dec. 114
New Jersey Association Holds Second Meeting	Feb. 120
New Jersey Association Holds Meeting	July 115
New Jersey Association Organization Completed	Mar. 128
New Jersey Dealers Prepare to Form State Association	Jan. 129
New Regulations Explained to Ohio Dealers at Fall Meetings.....	Dec. 114
New Mexico Association Elects Officers, by Fremont Kutnewsky	Sept. 138
North Carolina Added to List of Expanding State Organizations	Nov. 108
Nugent, Frank J., Named President of GAMA for 1949	Nov. 98
Ohio Group Adopts Constitution	July 118
Ohio Industry Men Form State LP-Gas Association	Mar. 121
Oklahoma-Southwest LP-Gas Convention Begins Sept. 12	Sept. 130
Oklahomans Attend Southwest LP-Gas Convention and Trade Show	June 233
Oregon Association Discusses Organizational Efforts	July 116
Oregon Dealers Form Association	May 136
Program of Fall Meeting of CNGA Largely Devoted to Propane	Nov. 98
Propane Will Be Theme for CNGA Fall Meeting	Oct. 109
Sept. 26-28, Annual Convention Colorado LP-Gas Dealers	Aug. 109

Organizations—Continued

Page

South Carolina Assn. Changes Bylaws	Sept.	127
South Carolina Dealers Hold Successful Convention	May	141
Southern California Dealers Organizing	Nov.	118
Speakers Hand Out Straight Talk at Texas Butane Convention, by Paul Lady	Aug.	110
States Group Plans Educational Programs	Jan.	130
Tennessee Holds First Annual Trade Show and Convention	Oct.	106
Tennessee LP-Gas Association Holds Short Convention	May	141
Texas Butane Dealers Assn. Planning for Third Annual Convention	June	234
Virginia LP-Gas Men Form State Association	Oct.	109
Whelan, C. O., is President Oklahoma LP-Gas Association	Feb.	75
Yates Resigns as Executive Secretary of Oklahoma LP-Gas Assn.	Nov.	110

Natural Gasoline Plants

Colorado Plant Will Make 60,000 Gals. of LP-Gas Daily	Jan.	154
Gas Cycling Plant Will Recover 80% of Propane	Nov.	141
Increased LP-Gas Production Due From New Processing Plant	Nov.	72
Massey's Field Begins First LP-Gas Production	Jan.	146
New Plant Will Increase LP-Gas 150,000 Gals. Daily	Sept.	165
New Texas Pipeline Will Supply California Refineries	Oct.	115
Phillips, Atlantic Refining Plan Eastern Propane Plant	Jan.	62
Propane Producers Increase Production Facilities	Aug.	158

O

Obituaries

Death Takes W. T. Joplin, Long Prominent in Industry	Aug.	140
Derry, Richard H., Protane Corp., Passed Away July 21	Sept.	156
Gregory, John T., Prominent Arkansas Gas Man, Dies	Mar.	142
Lackey, L. R., Gas Operator, Passed Away April 1	May	152
Oakford, Paul, LP-Gas Man, Dies Suddenly in Nevada	Nov.	141
Price, Harry C., Green's Fuel, Passes Away in Florida	Mar.	106
Smith, Edgar A., Texas Dealer, Killed in Auto Accident	Mar.	150
Smith, R. Stanley, Pump Designer, Passed Away May 26	July	49

P

Power

Arkansas Carburetion School Teaches Summer Load Building	July	147
Better Mileage Being Made on LP-Gas Carburetion	May	154
Butane and Propane As Tractor Fuels, by E. A. Jamison and J. R. Strother	Sept.	144
Butane as a Motor Fuel, by G. L. Holzapfel	Apr.	148

Power

Butane-Fueled Engines Power Electric Generating Plants, by Bob Smith	Mar.	144
Butane-Powered Trucks Excel Diesels In Minnesota Iron Ore Hauling, by A. C. Butterworth	Oct.	126
Butane-Propane Carburetion: A Simple Explanation of LP-Gas in Internal Combustion Engines, by Edward A. Stratman	Aug.	128
Convert Oklahoma Oil Field Trucks To Burn LP-Gas	July	148
Dix Will Distribute Fuel Analyzer for Eastern Firm	Apr.	172
Engine Conversions Look Good to Grogan Supply Co. in Texas	May	156
Engine Conversions Slowed Down by Fuel Shortages in Great Britain	July	146
Hill, J. B., Will Handle "Algas" Carburetors in Northern Calif.	Apr.	170
How to Figure Pumping Costs, by C. M. Denton	Jan.	140
LeRoi Announces High Power, Multi-Fuel Engines	Sept.	149
LP-Gas Inspectors Change Over Their Own Cars to Butane	May	151
Mack Truck Service Men Learn Correct Conversion Practices	May	150
Mobile Dispenser Will Aid Contractors, Highway Stations	Sept.	149
Moves 30 Tons at 17 MPR With Butane-Powered Bulldozer	Nov.	134
New 600 Hp Multi-Fuel Engine Made Specially for Oil Fields	Mar.	149
Positive Lock-Off Regulators, by Stanley Bell	Dec.	132
Roadmaster Products Co. Re-enters LP-Gas Carburetion	May	152
Safe Practices in Motor Fuel Use, by Roy Mylander	Feb.	146

Production and Supply

Available Gas Supply Six Times Present Demand, by T. W. Legatski	Dec.	58
Fuel for Next Winter, by William J. Murray, Jr.	Aug.	58
Fuel Outlook in the East, by W. W. Boynton	Jan.	84
Improving Light Ends Recovery, by G. W. McCullough, K. H. Hachmuth and A. J. Miller	July	107
More Propane—Less Money, by Z. C. Ambrose	July	107
New Production Facilities Will Increase Supply, by S. B. Crooks	July	86
Supply Outlook for 1948, 1949	Sept.	153
Uncertainties of Future Supply, by O. L. Garretson	Aug.	70

Pumps and Pumping

How to Figure Pumping Costs, by C. M. Denton	Jan.	140
Resistance-to-Flow in the LP-Gas Pump Discharge Line, by Lawrence W. Smith	Nov.	55

R

Regulation Codes and Laws

(See Fire Prevention and Regulation)

Appliance Recommendations Mailed Authorities by PCGA	May	182
Butane-Propane Legislation, by Arthur C. Kreutzer	Jan.	68

Regulations—Continued	Page
California Issues Amendments to State Safety Orders	Oct. 51
Codes—The LPGA Model Laws are Guides for States and Towns	June 210
Credit Control Regulations Became Effective Sept. 20	Oct. 101
Interior Secretary Krug Authorizes Allocation Plan	Oct. 57
Missouri Regulatory Authority Will Inspect Motor Fuels	Apr. 87
New Provisions in California Law Affecting Filling Stations	Oct. 61
New Regulations Covering LP-Gas	Feb. 174
Obeys Present Law is Enough, Says Fire Marshal	Feb. 167
Oklahomans Revise Regulations Covering Industry Operations	Feb. 167
Oklahomans Working For Better Rules	Mar. 156
Small Containers Must Be Filled By Weight Only	Sept. 73
Trailer Coach Standards Sought By Manufacturers and Industry, by F. F. Smith	July 122
Two California Counties Adopt New Ordinances	May 160
Two Changes Made in ICC Transportation Rules	July 103

S

Safety

Bulk Plant Safety Recommendations, by Walter Hanau	Nov. 88
Bulk Plants—What Makes Them Safe	June 75
Checking Equipment to Make a Safer Industry, by D. L. Breting	Dec. 99
Codes—The LPGA Model Laws are Guides for States and Towns	June 210
Do You Want An Employee Safety Program? by K. W. Rugh	Mar. 108
Fire Protection—Prevention, Control, Extinguishment	June 143
Fuel Delivery—Good Methods Bring New Customers and Hold the Old Ones	Oct. 101
Installation—Proper Methods Promote Safety and Customer Satisfaction	June 119
Insurance—How to Get It and How to Keep It	June 163
June Issue — Special Safety Number Study Fuel Characteristics To Be Safe, by G. M. Kintz	Feb. 89
Training—Makes Operations Safer	June 190
Truck Driver's "Clinic" Shows How Easy It Is To Be Safe, by O. D. Hall	Oct. 102

Sales Promotion—Adv., Demonstrations

"Advertising Package" Ready For Dealers, by Lowe Runkle	Mar. 81
Best Place to Sell: Ahead of the Electric Lines	Dec. 76
"Competitors May Be Gentlemen," by Zoe Johnson	Oct. 154
Demonstration Trailer	Nov. 138
Gas Salesmen by the Million	Nov. 176
Good Merchandising Methods Win, by O. D. Hall	Feb. 68
Good Service and Careful Installations Build Profitable Business for Kansas	

Sales Promotion—Adv., Demonstrations	Page
Firm	Oct. 136
How To Improve Sales Technique, by T. W. Coover	Feb. 182
It's the Woman Who Buys, by Maydel Massey	July 79
LP-Gas Dealer and Gas Utility Show Practical Cooperation at Industrial Fair	July 55
Sell the Woman to Sell the Deal, by S. W. Ellis	Jan. 113
Should Small Dealers Advertise?	Sept. 68
Steal Customers? You'll Lose If You Do, by Minnette Lake Warren	Aug. 52
Thirteen Ways to Win Customers, by Harry L. Spooner	Oct. 47
Traveling Demonstration Trailer, by J. L. McKinley	July 50

Service and Service Schools (See Education)

Distributor Holds Service School For Employes and Dealers, by W. A. Schuette	Mar. 72
Kansas Service School's Success Points Way to Advancement	Apr. 139
Novel Field School Teaches Way to Make Fast Transfers, by O. D. Hall	Mar. 74
Now It's the Night School!	Dec. 94
Repair Service, When It's Good It Beats Competition, by S. W. Ellis	April 64
Safety-Service Training Schools, by Bob Farson	Oct. 99
Southeastern Dealers Attend Service School	Sept. 143
Students Get Close to Industry Problems at School, by O. D. Hall	July 65
Texas Association Sponsors LP-Gas Service School	July 76

Statistics (Production, National and State Sales)

Arkansas Survey Shows 45,000 Systems Using 10 Million Gallons of Gas Annually	Aug. 124
Domestic Load Demand 52.1% of All LP-Gas Sales in 1947	Oct. 64
Fuel Outlook on Pacific Coast	Nov. 76
Gas Range Shipments Up, Water Heaters Down, Says GAMA	Nov. 74
LP-Gas Sales Gain 30% in 1947, by R. W. Thomas and K. W. Rugh	Jan. 41
Pacific Coast Sales Up 24% in '47, by Edward T. Knudsen	Aug. 55
Shipment of LP-Gas Ranges Led the Field in May	Sept. 154

T

Technical

Research in Gas Pilot Burner For Protection from Dust	Mar. 182
Use of Unfired Pressure Vessels in LP-Gas Industry, Part 1, by E. O. Matlocks	July 43
Use of Unfired Pressure Vessels in LP-Gas Industry, Part 2, by E. O. Matlocks	Aug. 61
Use of Unfired Pressure Vessels in LP-Gas Industry, Part 3, by E. O. Matlocks	Sept. 100
Use of Unfired Pressure Vessels in LP-Gas Industry, Part 4, by E. O. Matlocks	Oct. 78

ADVERTISERS

American Car & Foundry Co.....	50	Mallinckrodt Chemical Works.....	180
American Pipe & Steel Corp.....	38	Manchester Welding & Fabricating Co.	183
American Radiator & Standard Sanitary Corp.....	139	Master Tank & Welding Co.....	117
Anchor Petroleum Co.....Third Cover		McNamar Boiler & Tank Co.....	137
Anco Manufacturing & Supply Co....	3	Midland Parts & Bearings Co.....	178
Assembly Products, Inc.....	179	Minneapolis - Honeywell Regulator Co.	146
Autoweld Corp.....	49	Mitchell Co., John E.....	29
		Mutual Liquid Gas Equipment Co., Inc.	89
Bastian-Blessing Co., The.....96, 97		National L-P Gas Institute.....	168
Beacon Petroleum Co.....	87	National Tube Co.....	150
Black, Sivalls & Bryson, Inc.....	8, 9	Neptune Meter Co.....	42
Bottled Gas Manual, The.....	141		
Brodie Co., Inc., Ralph N.....	178	Ohio Foundry & Manufacturing Co...	167
Bryant Heater Co.....	183	O'Keefe & Merritt Co.....	98
Buehler Tank & Welding Works.....	46		
Butler Manufacturing Co.....	6, 7	Peerless Manufacturing Corp.....	166
		Peerless Pump Division.....	174
Calgon, Inc., Micromet Div.....	129	Phillips Petroleum Co.....	156
Carter Oil Co., The.....	173	Pitman & Sons Sales Corp., J. C.....	158
Cities Service Oil Co.....	170	Pittsburg Water Heater Corp.....	159
Climax Industries, Inc.....	33	Pittsburgh Equitable Meter Div., Rockwell Manufacturing Co.....	1
Clow & Sons, James B.....	26	Posay Iron Works, Inc.....	14
Columbian Steel Tank Co.....	124	Premier Stove Co.....	164
Compressed Gas Cylinders, Inc.....	121	Pressed Steel Tank Co.....Second Cover	
Dallas Tank Co., Inc.....	37	Ransome Co., The.....	30
Day & Night Manufacturing Co.....	153	Rector Well Equipment Co.....	176
Dearborn Stove Co.....	145	Reliance Regulator Corp.....	107
De Larazelere Co., Frank P.....	175	Reznor Manufacturing Co.....	103
Delta Tank Manufacturing Co., Inc.....	27	Roney, Inc., L. C.....	25
Detroit-Michigan Stove Co.....	155	Rose & Co., Inc., J.....	179
Dickerson Manufacturing Co.....	183		
Dix Manufacturing Co.....	179	Santa Fe Engineering & Equipment Co.....	134
Dresser Industries, Inc.....153, 183		Scaife Co.....	4, 5
		Schaaf Bros., Inc.....	178
Empire Stove Co.....	160	Security Manufacturing Co.....	167
Ensign Carburetor Co.....	135	Selwyn-Landers Co.....	17
		Servel, Inc.....	20, 21
F & E Manufacturing Co.....	179	Shand & Jurs Co.....	83
Fine Products Co.....	171	Sinclair Prairie Oil Co.....	127
Fisher Governor Co.....	15	Smith Corp., A. O. (Gas Tanks)....	34, 35
Florence Stove Co.....	130	Smith Precision Products Co.....	45
		Southern Heater Corp.....	149
Gas Appliance Manufacturers Assn. 10, 11		Sprague Meter Co.....	113
Gas Equipment Co., Inc.....	169	Stampings, Inc.....	104
Gas Equipment Supply Co.....	175	Standard Gas Equipment Corp.....	110
General Controls.....	36	Staunton, Glover & Co.....	180
Golden Glow Manufacturing Co.....	177	Superior Refrigeration Supply Co....	178
Grover Products Co.....	180	Superior Tank & Construction Co...	28
		Superior Valve & Fittings Co.....	24
Harper-Wyman Co.....16, 81		Supermatic Products Corp.....	177
Hartwell Co.....	180		
Heatbath Appliances, Inc.....	177	Trageser Copper Works, Inc., Fourth Cover	
Home National Bank of Arkansas City	165		
Ingersoll-Rand Co.....	31	United Petroleum Gas Co.....22, 23, 44	
Independent Metal Products Co.....	176	United States Steel.....	150
Johnson Gas Appliance Co.....	173		
Lawson Manufacturing Co.....	95	Viking Pump Co.....	172
Leggett Co., S. H.....	177	Vulcan Proofing Co.....	32
Lubbock Machine Co., Inc.....	122		
Lukens Steel Co. & Divisions.....	115	Ward Heater Co.....	90
		Warren Petroleum Corp.....Front Cover	
		Weatherhead Co., The.....18, 19	
		Welbilt Stove Co., Inc.....	93
		Western Gas Equipment Co.....	171
		Western Stove Co.....12, 13	

